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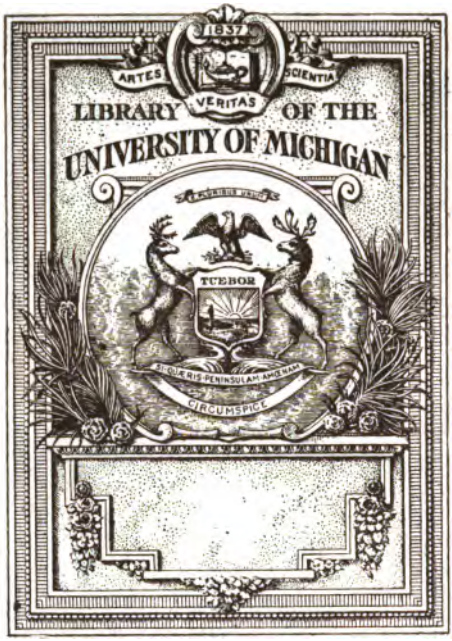
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Uttmark's Guide *to the* United States Local Inspectors Examination *for* Masters and Mates *of* Ocean Going Steam and Sailing Ships :: :: ::

By

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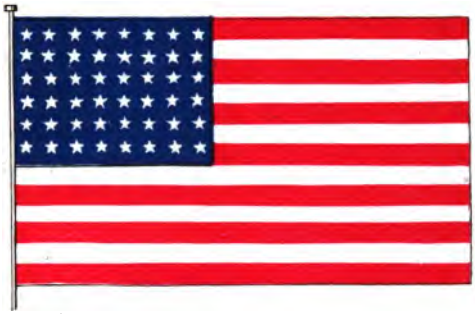


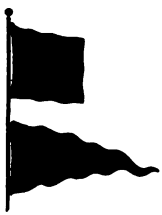
ENSIGN

UNION JACK

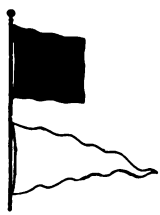
SMALL CRAFT, STORM, AND HURRICANE WARNINGS

Storm

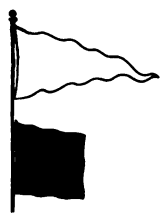
Northeasterly winds



Southeasterly winds

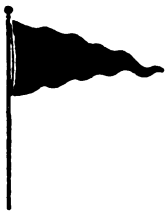


Southwesterly winds



Northwesterly winds

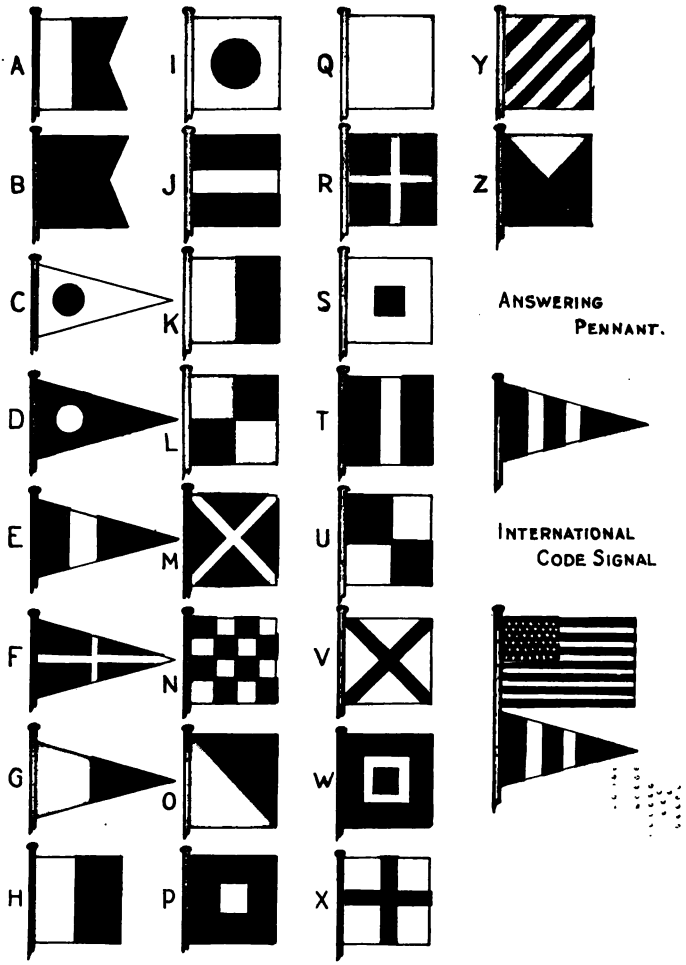
Flags, 8 feet square. Pennants, 8-foot hoist, 15-foot fly.



Small craft

Hurricane

Flags and Pennants used in the International Code.



The backbone of a nation is its oversea commerce, and its strength is her merchant marine, backed and supported by an adequate and efficient Navy.

To those who follow the maritime profession this work is dedicated.

The Author.

326668

CAPTAIN F. E. UTTMARK

Preface to the First Edition

In the venture of placing this volume on an already crowded field the Author wishes to state that he does not pretend to be accomplishing anything new, but if he has managed to furnish a guide to U. S. Local Examinations for Masters and Mates and in a clear, concise and comprehensive, yet scientifically accurate way, handle the subject so that it will be a real help to the student and lighten his work in studying for license as Master or Mate and enable him to pass his examination in a satisfactory manner, this little volume has fulfilled its purpose.

Preface to the Second Edition

The first edition being exhausted, the author takes this opportunity to thank the many students and navigators for their kind remarks and favorable comments on the work. The present edition is to some extent revised and enlarged. Hoping this work will be as favorably received as the first and be of help and use to the navigator.

The Author.

Preface

The questions contained in this work are to be answered by all applicants for license as Master and Mate of Ocean-going steamships in their examination before the U. S. Local Inspectors of Steam-vessels. The Examiner will select a number of questions from those found in this list, therefore the applicant should be familiar with all the answers belonging to his examination.

The applicant for a master's license should be able to answer all the questions, and the applicant for a mate's license should be able to answer those questions marked with an asterisk (*). The examination questions for First, Second and Third Mates are the same.

The answers to the various questions in this work are clear, and as short as possible for a comprehensive explanation. The applicant may use his own words if desired in explaining the different questions, taking care, however, that they contain the full sense of the respective answers.

The definitions as well as all the other questions and answers are arranged as much as possible in a logical sequence and no attempt has been made to follow the order set forth by any particular Board of Local Inspectors.

The applicant must be able to demonstrate proficiency in the theoretical science of Navigation, as well as the practical solution of the problems set by the examiner.

— Any person with two years' experience in the deck department of a steam vessel is eligible for an Officer's License.

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EXAMINATION QUESTIONS AND ANSWERS

FOR

MASTERS AND MATES OF OCEAN STEAMSHIPS

The Master answers all the Questions and the Mates answer those Questions marked with an asterisk (*).

1.—**What is Navigation?*

The Science that enables us to determine our position at sea and to conduct the ship from place to place is in general terms called Navigation, it consists of two parts, *Navigation* and *Nautical Astronomy.*

Navigation according to the first term enables us to determine our position by reference to the Earth and is further subdivided into *a. Piloting* or *Coasting* when position is obtained by reference to visible objects on the earth or from soundings of the depth of water and the nature of the bottom; *b. Dead Reckoning* in which the ship's position is deducted from courses steered and distances run from a given point of departure.

Nautical Astronomy. This term is used for that part of the science which enables us to determine the ship's position by observations of the celestial bodies —the sun, moon, planets and fixed stars.

2.—**What is a Right Angle?*

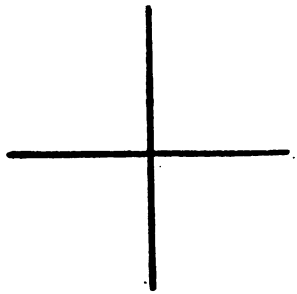


Fig. 1.

A Right Angle is an angle of ninety degrees (90°) or the fourth part of a circle. All the angles in Fig. 1 are Right Angles.

3.—**What is an Oblique Angle?*

An angle greater or less than 90° is called *oblique.*

The angle BAC and BAD (Fig. 2) are oblique angles.

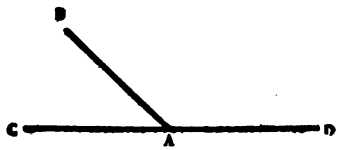


Fig. 2.

4.—**What is an Obtuse Angle, also an Acute Angle?*

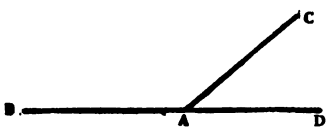


Fig. 3.

An angle greater than 90° is called *obtuse;* less than 90° is called *acute.*

The angle B A C is an obtuse angle.

The angle C A D is an acute angle.

5.—**What is a Spherical Angle?*

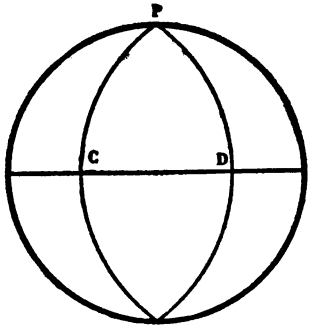


Fig. 4.

An angle formed by intersection of two great circles is called a *spherical angle.*

The angle C P D (Fig. 4) is a spherical angle.

6.—**What is an Arc?*

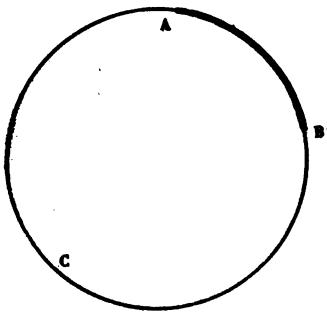


Fig. 5.

A part of the circumference of a circle is called an *arc.*

The curved line A B (Fig. 5) is an arc of the circle A B C A.

7.—**What is Complement of an Arc or Angle?*

The difference between an arc or angle and 90° is called *complement* to that *arc* or *angle.*

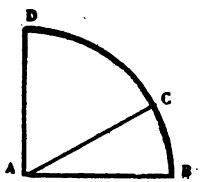


Fig. 6.

The arc C B (Fig. 6) is the complement to C D. The angle B A C is the complement to C A D.

The angle D A B is a right angle.

8.—***What is the supplement to an Arc or Angle?**

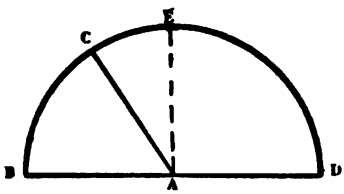


Fig. 7.

The difference between an *arc* or *angle* and 180° is called its *supplement.*

The arc C B (Fig. 7) is the supplement to C D.

The angle C A B is the supplement to C A D.

9.—***What is a Great Circle?**

A circle whose plane passes through the center of a sphere is called a *great circle.* All the lines in Fig. 8 are great circles.

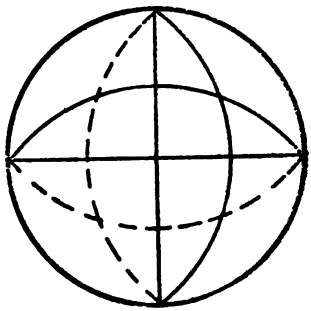


Fig. 8.

10.—***What is a Radius?**

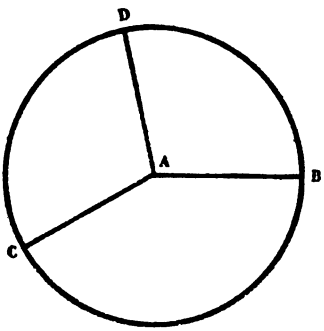


Fig. 9

A straight line drawn from the center of a circle to its circumference is called *Radius.* The lines A B, A C and A D are radius to the circle in Fig. 9.

11.—***What are Small Circles?**

Circles whose planes do not pass through the center of the sphere are called *small circles.* AB, CD, EF and GH are small circles. (Fig. 10.)

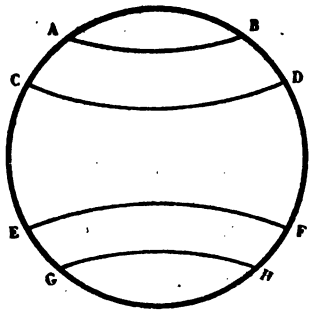


Fig. 10.

12.—***What are Zenith and Nadir?**

The point vertically overhead of the observer is called *Zenith* and the point vertically beneath is called *Nadir.*

13.—***What are Vertical Circles?**

Great circles passing through Zenith perpendicular to the Horizon are called *Vertical Circles* or *Verticals.*

Z is the Zenith.

O is the place of the observer.

H H′ is the observer's horizon.

Z V are all vertical circles or Verticals. (Fig. 11.)

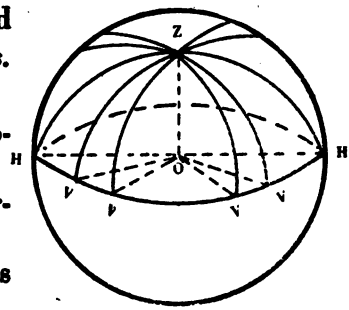


Fig. 11.

14.—***What is the Vertex of a great Circle?**

The point of a great circle which is nearest the pole is called its *Vertex.*

C D is a great circle. P is the Pole to the circle. V is the vertex of the circle C D. (Fig. 12.)

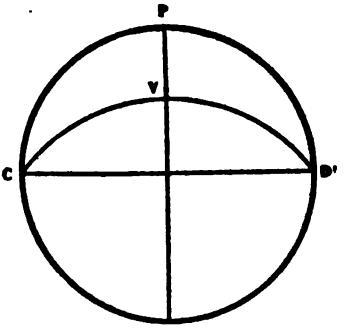


Fig. 12.

15.—***What is the Equator?**

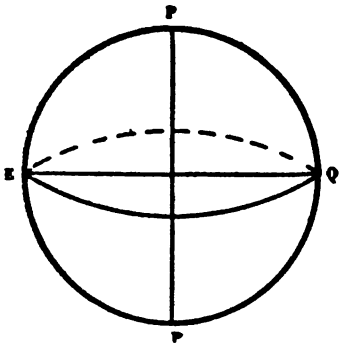


Fig. 13.

The Equator is a great circle formed by the intersection with the Earth's surface of a plane perpendicular to its axis. The Equator is equidistant from the poles. Every point of the Equator is 90 degrees from the poles. The great circle E Q is the Equator. (Fig. 13.)

16.—***What is Latitude?**

is the arc of the meridian intercepted between the Equator and the given place. Latitude is reckoned from the Equator (Lat. 0) and expressed in *degrees, minutes* and *seconds* North and South, up to 90° at the Poles.

P is the Pole.

E Q E is the Equator.

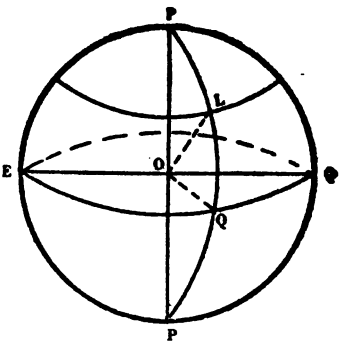


Fig. 14.

The Latitude of a place or position on the Earth L O Q or L Q is the Latitude of L. (Fig. 14.)

17.—***What are Parallels of Latitude?**

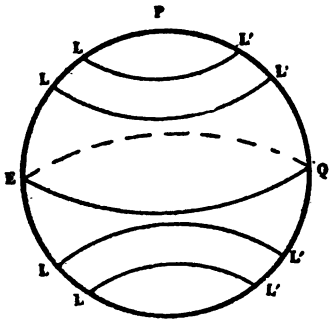


Fig. 15.

Parallels of Latitude are small circles formed by intersection of planes parallel to the *Equator.*

E Q is the Equator.

L L′ are Parallels of Latitude. (Fig. 15.)

18.—***What is Longitude?**

The angle at the Pole contained between the meridians of any place or position on earth and a certain meridian assumed to be the first or prime meridian. The Longitude is measured on the Equator and reckoned East or West up to 180°. The meridian passing through the observatory at Greenwich (England) is generally accepted as the first meridian. Fig. 16 illustrates East and West Longitude.

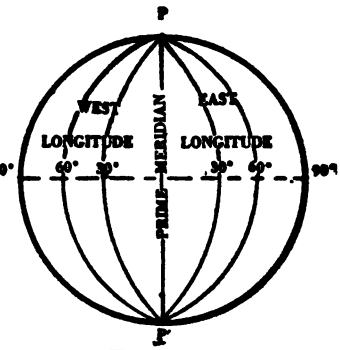


Fig. 16.

19.—**What is Difference in Latitude?*

The difference of Latitude between the two places, A and B, is the arc of a meridian intercepted between the parallels of Latitude of the given places and is named North or South according to the direction from one place to the other.

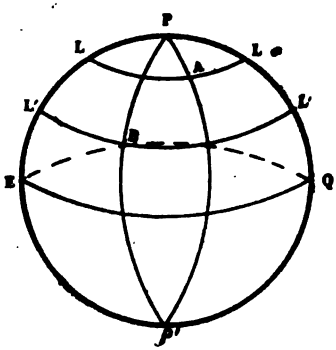


Fig. 17.

The *difference* of *Latitude* between A and B is L L′ reckoned *South* from A or *North* from B. (Fig. 17.)

20.—**What is Departure?*

The Departure is the distance East or West between the meridians of two places or positions and is reckoned in *miles*. We must note that this distance decreases as the meridians converge towards the poles.

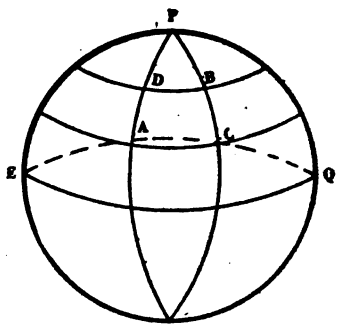


Fig. 18.

The Departure between the meridians of A and B is the distance A C in miles on the Latitude of A or the distance D B in miles on the Latitude of B. (Fig. 18.)

21.—**What are the Terrestrial Poles?*

The Terrestrial Poles are the terminal points of the earth's axis around which the earth revolves.

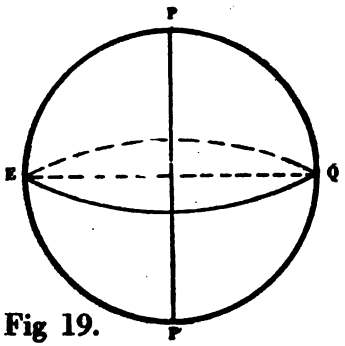


Fig 19.

P represents the North Pole.

P′ represents the South Pole.

The line P P′ represents axis of the earth. (Fig. 19.)

22.—**What are the Meridians?*

Meridians are great circles passing through the Poles and cutting the Equator at right angles.

The great circles P Q P′ Q are all Meridians.

E Q is the Equator. (Fig. 20.)

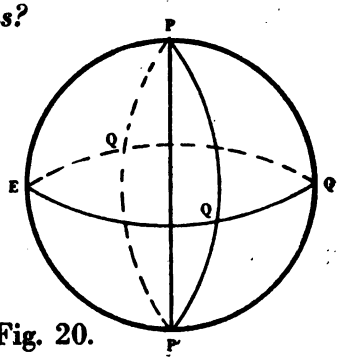


Fig. 20.

23.—**What are the Tropics?*

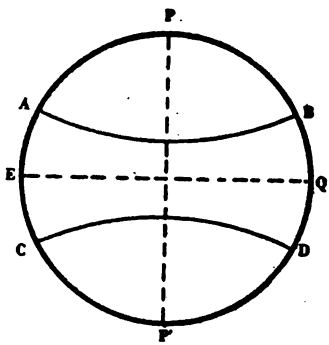


Fig. 21.

The Tropics are small circles approximately 23½° from the Equator and mark the extremities of the Sun's declination North and South.

A B in the Northern Hemisphere is called the *Tropic of Cancer.* C D in the Southern Hemisphere is called the *Tropic of Capricorn.*

24.—***What is Polar Distance?**

The Polar Distance of a celestial body is its distance from the elevated pole of the observer measured upon the circle of declination passing through the center of the body.

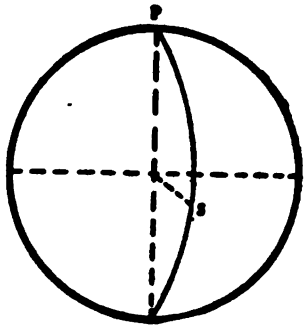


Fig. 22.

It is 90° plus declination if the *Latitude* of the observer and the *declination* of the body is of opposite name, but 90° minus *declination* if of same name.

P is the elevated Pole.

P S is the Polar Distance of S. (Fig. 22.)

25.—***What is Declination?**

The Declination of a celestial body is the angular distance from the equinoctial, measured upon the declination circle which passes through the center of the body, it is named North or South according to its direction from the Equinoctial.

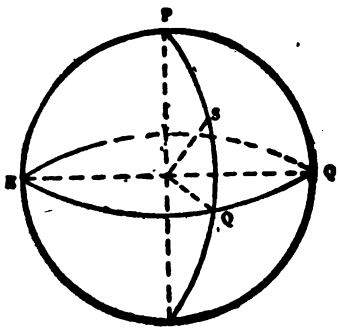


Fig. 23.

E Q is the Equinoctial.

S Q is the declination of S. (Fig. 23.)

26.—**What is Right Ascension?*

The Right Ascension of a celestial body is the angle at the Pole between the hour circle of the *body* and that of the first point of *Aries*. It is measured from the first point of Aries Eastward extending up to 360° or 24 hours.

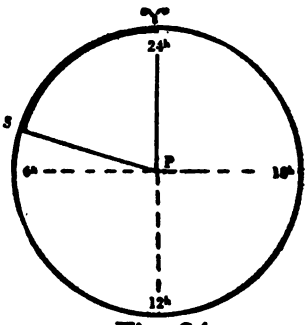


Fig. 24.

P is the Pole.

A is the first point of Aries.

A S is the Right Ascension of S. (Fig. 24.)

27.—**What is Sidereal Time?*

Siderael Time is the hour angle of the first point of Aries. This point which is identical with the vernal equinox, is the origin of all co-ordinates and does not, like the Sun, Moon and the planets have, actual or apparent motion therein. It shares in this respect the properties of the fixed stars. We may therefore say that intervals of Sidereal Time are measured by the stars.

28.—**What is Apparent Sun?*

The Apparent Sun is the real visible Sun. Its apparent movement in the ecliptic is irregular, rendering days of unequal length.

29.—**What is the Mean Sun?*

An imaginary Sun is supposed to move in the equinoctial with a uniform velocity equal to the

mean velocity of the true Sun in the ecliptic. This Mean Sun is supposed to coincide with the true Sun at the vernal equinox or the first point in Aries.

30.—**What is Apparent Time?*

Apparent Time or Solar Time is the hour angle of the center of the Sun. An *apparent or solar* day is the interval of two successive transits of the Sun. It is *apparent noon* when the Sun's hour circle coincides with the celestial meridian. This is the most natural and direct measure of time, and the unit of time adopted by the Navigator at sea is the apparent solar day.

31.—**What is Mean Time?*

Mean Time is the hour angle of the Mean Sun. A mean day is the interval between two successive transits of the Mean Sun over the meridian or the mean of all the Solar days in the year. Mean noon is the instant when the Mean Sun's hour angle coincides with the meridian. Mean Time lapses uniformly. At certain times it agrees with the apparent time, while at times it is behind and at other times in advance of the apparent time. Ordinary clocks, and chronometers for use in Navigation are regulated to this time.

32.—**What is Equation of Time?*

Equation of time is the difference between mean and apparent time. The amount and application may be found in the Nautical Almanac for any given day.

33.—***What is Civil Time?**

Civil Time is the time used in ordinary every-day life. It begins at midnight and ends the following midnight, reckoning two periods, A. M. (ante meridiem) and P. M. (post meridiem) of twelve hours each. (Fig. 25.)

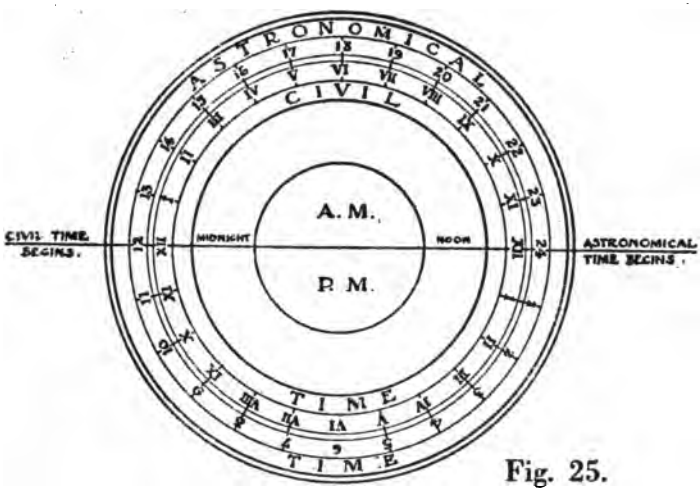


Fig. 25.

34.—***What is Astronomical Time?**

Astronomical Time is a continuous period of twenty-four hours, beginning at noon and ending at noon the following day. (Fig. 25.)

35.—***What are the Celestial Poles?**

The extension of the poles of the earth into space, or the poles of the celestial sphere are called Celestial Poles.

36.—***What is the Elevated Pole?**

The pole which is above the horizon of the observer, or the pole of the earth of the same latitude as the observer, projected into the heavens.

37.—**What is the Equinoctial?*

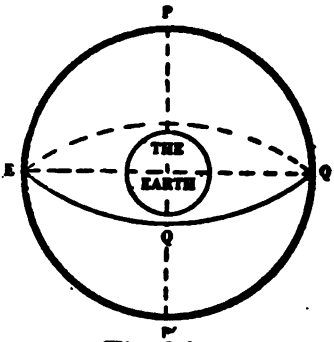


Fig. 26.

The Equinoctial or Celestial Equator is the great circle formed by extending the Equator of the earth until it intersects the celestial sphere.

E Q E is the Equinoctial. (Fig. 26.)

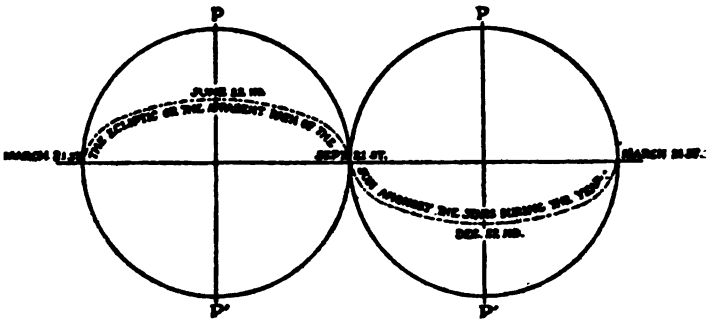


Fig. 27.

38.—**What is the Ecliptic?*

The Ecliptic is the great circle representing the path in which the sun, owing to the yearly revolution of the earth, appears to move in the celestial sphere. The plane of the Ecliptic is inclined to that of the Equinoctial at an angle of 23° 27½′. This inclination is called the obliquity of the Ecliptic.

C C′ represents the Ecliptic. (Fig. 27.)

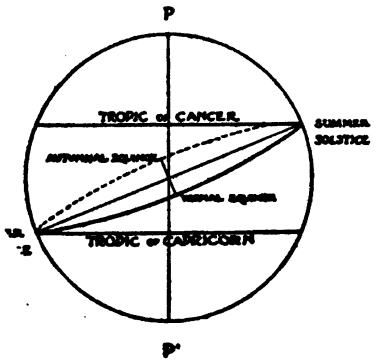


Fig. 27a.

39.—**What are the Solstitial Points?*

The Solstitial points or Solstices are points on the ecliptic 90° from equinoxes at which the sun reaches its highest declination in each hemisphere. They are called Summer or Winter Solstices, according to the time of the year. (Fig. 27a.)

40.—**What is Celestial Latitude?*

Celestial Latitude of any point in the heavens is its distance North or South from the ecliptic measured on a great circle at right angles thereto.

41.—**What is Celestial Longitude?*

Celestial Longitude of any point in the heavens is its distance from the first point of Aries measured on the ecliptic eastward up to 360°.

42.—**What are Co-ordinates?*

A system of lines, angles or planes, or a combina-

tion of these used in determining the position of a point from some fixed plane or line adopted as a primary.

43.—**What are Hour Circles?*

Hour Circles, declination circles, or celestial meridians are great circles of the celestial sphere passing through the poles. They are therefore at right angles to the equinoctial and may be considered formed by extention of the terrestrial meridians until they intersect the celestial sphere.

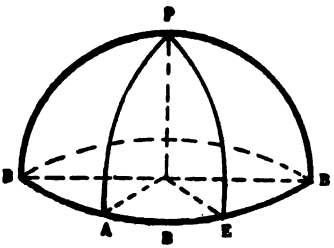


Fig. 28.

P A, P B, and P E are Hour Circles. (Fig. 28.)

44.—**What is the Visible Horizon?*

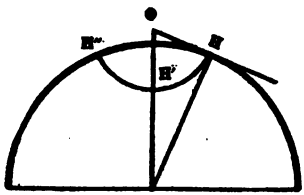


Fig. 30.

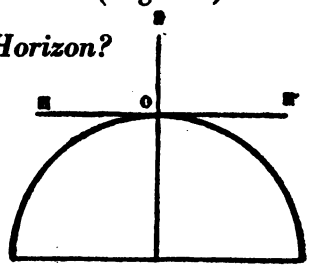
The Visible Horizon is a small circle limiting the observer's view at sea or the intersection of sea and sky.

O is the point of observation.

H H′ H″ is the visible horizon of O. (Fig. 29.)

45.—**What is the Sensible Horizon?*

The Sensible Horizon is a plane at right angles to the plumb-line at the point of observation in Fig. 30. H H′ is the Sensible Horizon.



46.—**What is the Celestial Horizon?*

The Celestial Horizon is the great circle formed by a plane passing through the center of the earth at right angles to the zenith of the observer and extended until it intersects the celestial sphere. The plane of the Celestial Horizon is parallel to the plane of the Sensible Horizon.

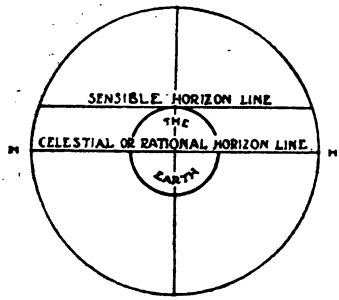


Fig. 31.

H H′ in Fig. 31 represents the Celestial Horizon.

47.—*What is the Artificial Horizon?*

Any liquid in a state of rest forming a reflective surface is an Artificial Horizon. Mercury being generally used for this purpose.

48.—**What is the Dip of the Horizon?*

The dip of the sea horizon is the angle of depression at the point of observation due to the elevation of the observer's eye above the level of the sea, or the angle between the Visible and the Sensible Horizon.

In Fig. 32, the angle H O H′ is the *Dip* of the Horizon as seen from the point of observation at O.

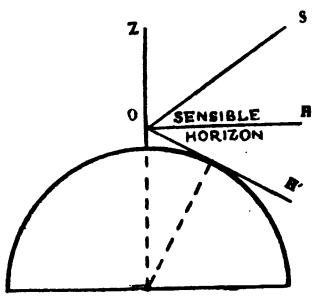


Fig. 32.

49.—***What is Refraction?**

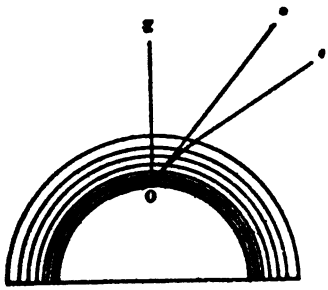


Fig. 33.

Refraction is the bending of a ray of light when passing through the atmosphere. It renders the observed altitude to appear greater than its real value.

The angles S O S′ is refraction. (Fig. 33.)

50.—***What is Parallax?**

Parallax is the angle of the earth's radius at the position of the observer as seen from the center of a celestial body.

O is the position of the observer.

O C is the radius of the earth.

S is the center of the celestial body.

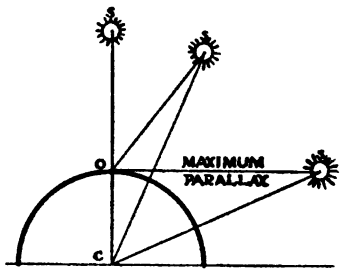


Fig. 34.

The angle O S C is the Parallt. (Fig. 34.)

51.—***What is Semi-Diameter?**

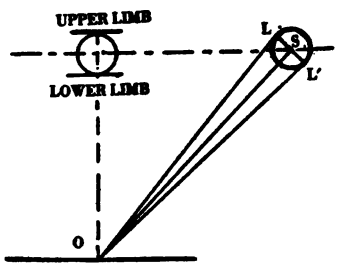


Fig. 35.

Semi-diameter or half diameter is the angular measurement of the radius of a celestial object as seen from the observer's position.

The angles S O L and S O L′ are the Semi-diameters of S. (Fig. 35.)

52.—*What is Augmentation of the Moon's Semidiameter?*

The Augmentation of the Moon's Semidiameter is the apparent increase due to the decrease in distance from the observer as the moon rises above the horizon.

53.—*What is Observed Altitude?*

The Observed Altitude is the angular height above the horizon as measured by the sextant and expressed in degrees, minutes and seconds of arc.

The angle S O H is the Observed Altitude of S. (Fig. 36.)

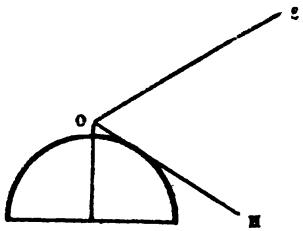


Fig. 36.

54.—**What is True Altitude?*

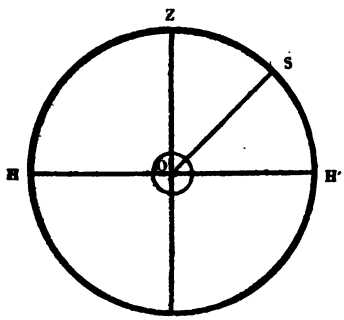


Fig. 37.

True Altitude is the angular height of a point or the center of a celestial body above the rational horizon, as measured from the center of the earth.

In Fig. 37. S O H′ is the True Altitude of S.

55.—*What is Zenith Distance?*

Zenith Distance is the arc of a vertical circle between the object and the zenith of the observer, or its true altitude subtracted from ninety degrees (90°—Alt.)

Z S or the angle Z O S is the Zenith Distance of S′. (Fig. 38.)

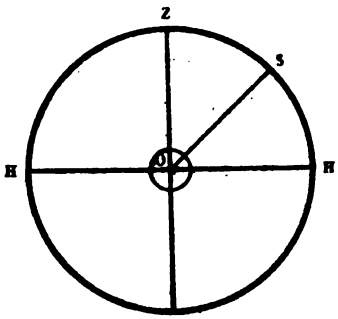


Fig. 38.

56.—**What is Amplitude?*

Amplitude is the angle at zenith between the prime vertical and the vertical circle passing through the center of the celestial body at the horizon while rising or setting. It is reckoned from East while rising and from West while setting toward North or South, according to the declination of the observed celestial body.

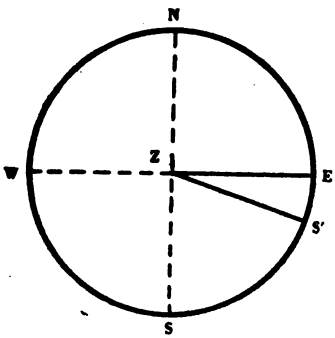


Fig. 39.

Z is the zenith.

S′ is a heavenly body.

The angle E Z S′ is the Amplitude of S′. (Fig. 39.)

57.—***What is Azimuth?**

Azimuth is the angle at zenith between the meridian of the observer and the vertical circle passing through the center of the celestial body. It is generally reckoned from North in North Latitude and from South in South Latitude up to 180°, East or West according to whether the body is East or West of the meridian.

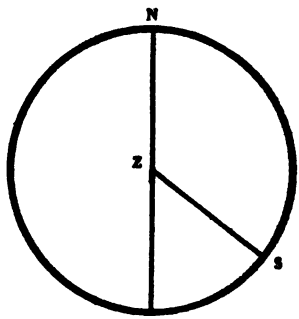


Fig. 40.

In Fig. 40, N S or the angle N Z S, is the Azimuth of S.

58.—***What are Diurnal Motions?**

The movements of the celestial bodies during the 24 hours are called Diurnal or Daily Motions.

59.—***What is a Nautical Chart?**

A Nautical Chart is a map representing a miniature portion of the sea, lakes or navigable rivers with coast lines, depths of water, nature of bottom, lights, lighthouses, buoys, currents and other useful information. There are three kinds, *Mercator's, Polyconic* and *Gnomic Projection.*

60.—***Describe the Mercator's Chart.**

On a Mercator's Chart the meridians are made parallel to one another, and the distance between the parallels of latitude is lengthened corresponding

to the widening of the meridians. On this chart the earth is represented as a at surface and the track of the vessel is shown as a straight line.

61.—**Describe the Polyconic Chart.*

On a chart constructed on the Polyconic projection principle, the meridians converge toward the poles and are in reality curved lines, the degrees of Latitude and Longitude are projected according to their true value. A straight line on this chart represents a near approach to a great circle and cuts all the meridians at a slightly different angle.

62.—*Describe the Gnomic Chart.*

In a Gnomic, or Gnomonic, Chart, the straight line between any two points represents the arc of a great circle, and is therefore the shortest line between those two points. This chart is used in the polar regions where a Mercators Chart can not be constructed. It is also used for finding the course and distance in great circle sailings.

63.—**What are the Magnetic Poles?*

All magnets have at each of their extremities, poles of different nature which we designate respectively as North and South Poles. The law of Magnetism is that poles of same name repel each other, and poles of different name attract each other. The earth may be considered as a huge magnet with two poles of opposite name. The one in the Northern Hemisphere is called the magnetic North Pole,

and the one in the Southern Hemisphere is called the magnetic South Pole. The North Magnetic Pole is situated approximately in Latitude 70° 00′ North and Longitude 97° West of Greenwich. The South Magnetic Pole is situated in Latitude 73° 30′ South, and Longitude 147° 30′ East of Greenwich.

A magnetic needle freely suspended and allowed to come to rest unaffected by any local attraction, will do so in the magnetic meridian.

64.—**What are the Magnetic Meridians?*

The Magnetic Meridians are curved and somewhat irregular lines extending between the magnetic poles.

65.—**What is the Magnetic Equator?*

The Magnetic Equator is the plane of a circle midway between the magnetic poles at right angles to the magnetic meridians.

66.—**What is the Mariner's Compass?*

The Mariner's Compass consist of non-magnetic metallic bowl in the center of which is fixed a pivot. A magnetic needle, or generally several pairs of needles, parallel with one another, are so centered and balanced on the pivot that they can freely swing in the horizontal plane and undisturbed by proximity of iron will come to rest in the magnetic meridian. The ship's course is measured by this instrument, and bearings of objects on land as well as amplitudes and azimuths of the heavenly bodies are measured.

67.—***What is Variation of the Compass?**

Variation of the Compass is the angular difference between the magnetic meridian and the true meridian. It differs in amount and name according to the observer's position on the globe. The variation is called Westerly if the *North* end of the magnetic needle points to the *left* of the true meridian, and *Easterly* if the same end of the needle points to the *right* hand side of the true meridian.

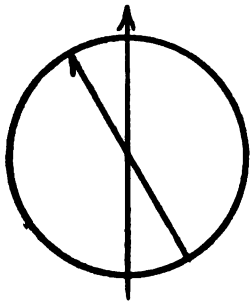


Fig. 42.

Fig. 42 indicates West Variation.

Fig. 43 indicates East Variation.

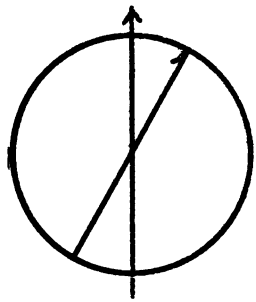


Fig. 43.

68.—***What is Deviation of the Compass?**

The Deviation of the Compass is the angular difference between the compass meridian (the compass North and South line) and the Magnetic Meridian. It is caused by iron in the construction of the ship or in her cargo, also by temporary local attraction.

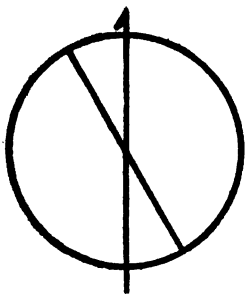
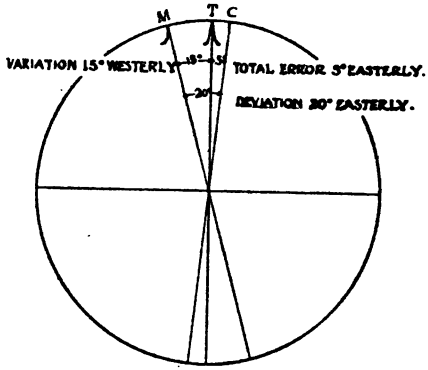
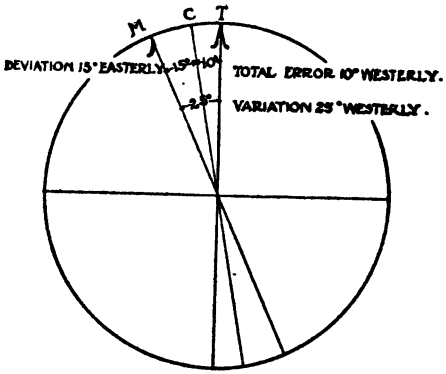
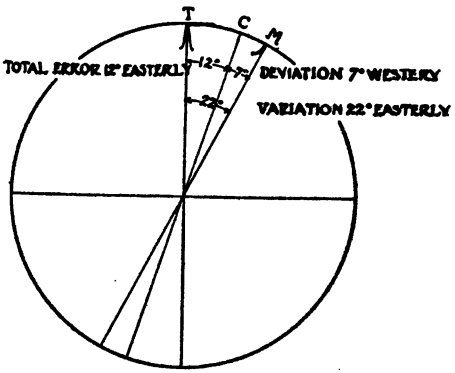


Fig. 44.

Diagrams Showing Variation and Deviation







When the *North* end of the compass needle points to the *left* of the magnetic meridian the deviation is called *Westerly* and when the same end of the needle points to the *right* of the magnetic meridian the deviation is called *Easterly*. It differs in amount and name according to the course the ship is steering.

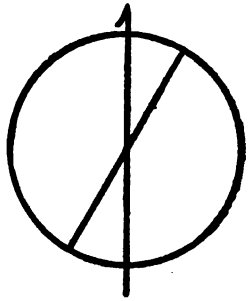


Fig. 45.

Fig. 44 indicates West Deviation.

Fig. 45 indicates East Deviation.

69.—**How would you determine the deviation of the Compass?*

By amplitudes or azimuths of celestial bodies, by compass bearings of a remote object shown on the chart and whose correct magnetic bearing is known, by ranges and by reciprocal bearings.

70.—**How is deviation of the Compass Compensated?*

By the employment of artificial magnets placed on or under the deck near the compass, or within the Binnacle Stand.

71.—**What is the Line of No Variation?*

A line drawn through certain places on the surface of the earth where the compass needle points true North or South.

72.—**Describe Plane Sailing.*

In plane sailing the curvature of the earth is

neglected and navigation is calculated on the assumption that the earth is an extended plane or flat surface instead of a globe. In plane sailing we consider only the course, distance, the difference of Latitude and Departure. When two or more courses are considered the combination is callet Traverse Sailing.

73.—**Describe Parallel Sailing.*

Sailing along a parallel of Latitude East or West and converting departure into difference of Longitude is called Parallel Sailing.

74.—**Describe Middle Latitude Sailing.*

Find the difference of latitude and the difference of longitude between the ship's place and the port bound to, then convert the difference of longitude into departure by the use of the middle latitude; next with the difference of latitude and departure find in the tables the true course and the distance to be sailed. To this true course apply the variation and deviation of the compass in order to obtain the compass course to steer. This may also be worked out by logarithms.

75.—**Describe Mercator Sailing.*

Find the difference of latitude and the difference of longitude between the ship's place and the port bound to, then change the difference of latitude into meridional parts, with which and the difference of longitude find in the tables the true course. On the page of this course enter with the nautical difference of latitude in the latitude column, and opposite to the left in the distance column will be found the distance to be sailed. The variation and deviation of the

compass must be applied to the true course in order to obtain the compass course to be steered. This may also be worked out by logarithms.

76.—*Describe Great Circle Sailing.*

When the ship sails a course along a great circle, it is called great circle sailing. This is the shortest distance between two places and the only course on which the ship is continuously heading direct for the desired port or place.

77.—*How do you find Course and Distance by Chart?*

Find the true course from point to point by the aid of the chart diagram compass and the parallel rules. To the true course apply the variation and deviation of the compass, and the answer will be the course to be steered by the ship's compass. Westerly variation and Westerly deviation are allowed to the right hand, and Easterly variation and Easterly deviation to the left hand when converting a true course into a compass course. To find the distance between the place of the ship and the place bound to, set the dividers to 60 miles (more or less according to the scale of the chart) on the side of the chart half way between the latitude of the two places, then see how many times this "set" is contained on the line of the course. On an inland chart, where the variation is practically the same over the whole surface, the correct magnetic course may be found direct from the magnetic diagram compass, thus leaving only the deviation of the compass to be applied by the navigator.

78.—*Do the Chart Compass Diagrams Represent *True or Magnetic Directions?*

Often times the compass diagrams are double, the outside one being true, and the inside one magnetic.

79.—**How do True and Magnetic Chart Compass Diagrams Differ?*

The North and South line of the *true* compass diagram coincides with the true meridian; whereas the North and South line of the *Magnetic* compass diagram inclines at an angle from the true meridian; the angular difference is called Variation.

80.—**How Would You Find Latitude by Dead Reckoning?*

Correct the compass courses for leeway, variation, the send of the sea and current; and take the departure course into consideration. Against each course write the distance sailed and take from the nautical tables the corresponding difference of latitude and departure and apply the difference of latitude to the latitude left.

81.—**How Would You Find Longitude by Dead Reckoning?*

Using the middle latitude as a course, apply the departure in the latitude column, and find in the distance column to the left the amount of longitude made, which apply to the longitude left.

82.—**What is an Octant or Quadrant?*

An instrument of reflection for measuring latitudes of heavenly bodies, or angles in general. The arc is graduated in degrees and 15 or 20 minute divisions and its vernier in minutes and 15 or 20 seconds of arc. This instrument will read to at least 90 degrees of arc. It is called an Octant because it is an eighth part of a circle, or a quadrant because and according to the law of reflection we can measure angles of double that amount or 90 degrees of arc.

83.—**What is a Sextant?*

An instrument of reflection for measuring latitudes of heavenly bodies and angles in general. Its arc is generally graduated in degrees and 10 minute divisions, and its vernier in minutes and 10 seconds of arc. It is a sixth part of a circle or 60 degrees and according to the law of reflection we can measure angles of double that amount or 120 degrees of arc.

84.—**How Would You Detect Error in a Quadrant, Octant or Sextant?*

By going through the process of adjustment for the index mirror and the horizon glass.

85.—**How Would You Adjust a Quadrant or Sextant?*

The first adjustment is to see if the index glass is perpendicular to the plane of the instrument; this is done by moving the sliding limb to the center of the arc; then note if the arc reflected in the index glass and the arc seen direct form one unbroken line. If

they do, the index glass is perpendicular, but if not, make this adjustment with the screw on the back of the index glass.

The Second Adjustment is to see if the horizon glass is perpendicular to the plane of the instrument; this done by making the two zeros coincide with one another; then holding the instrument at an angle slightly inclined from the horizontal plane and if the reflected horizon and that seen direct, form an unbroken line, the horizon glass is perpendicular, but if not, make this adjustment with the top screw on the back of the horizon glass.

The Third Adjustment is to see if the horizon glass and the index glass are parallel to each other. To do this make the two zeros coincide, then hold the instrument vertically, and if the reflected horizon and that seen direct, form one unbroken line, the glasses are parallel, but if not, make this adjustment with the bottom screws on the back of the horizon glass.

If this screw should be broken, or if by some other means this adjustment cannot be made, then make the glasses parallel, using the tangent screw, and the amount the zero of the sliding limb is moved *on* or *off* the arc will be the index error, subtractive if *on* the arc, but additive if *off* the arc.

The Fourth Adjustment is to see that the axis of the telescope is parallel to the plane of the instrument. For this adjustment the inverting telescope is screwed in the collar of the instrument, and the telescope is turned until the parallel wires are parallel with the plane of the sextant. Two stars are then selected which are at least 90 degree apart, and an

exact contact is made at the wire nearest the plane of the instrument. Next the sextant is moved so as to throw the objects on the other parallel wire, and if the angle remains the same, this adjustment is correct, but if not perfect, the collar adjustment must be made by the screws on the back of the telescope collar. An error in this telescope adjustment always makes angles too great.

86.—**How do you find Latitude by the Sun at Meridian?*

Correct the observed altitude for dip, refraction, parallax, and semi-diameter, then obtain the zenith distance by subtracting the true altitude from 90 degrees; next correct the declination for the Greenwich time of observation, and apply same to the zenith distance, adding, if of the same name, but subtracting, if of different names, and the answer will be the Latitude.

87.—*How do you find Latitude by Ex-Meridian of the Sun?*

Observe an altitude as close to noon as possible, and note the time shown by chronometer, which correst for its rate; then apply the equation of time for the given day, so as to obtain the apparent time at Greenwich. Next turn the ship's longitude into time, by the use of Table 7, and *add* same to the Greenwich time if the ship is in *East* longitude, but subtract if the ship is in *West* longitude, and the result will be the local apparent time at ship when the sight was taken. With the sun's declination and the lati-

tude by dead reckoning, select from Table 26 the change of the sun's altitude for one minute before or one minute past noon, and refer these given figures to the side column in Table 27; then under the nearest time from noon will be found the augmentation of the altitude. Correct the observed altitude for dip, refraction, parallax and semidiameter and add the augmentation to this altitude, the result will be the meridian altitude of the sun. Find the zenith distance and apply the declination in the usual way, the result will be the latitude of the ship at the time of sight.

88.—**How do you find Latitude by the Pole Star?*

Observe an altitude of Polaris at any hour of the night and correct for dip and refraction. Having noted the chronometer at sight, convert same into astronomical time. To this latter apply the ship's longitude in time, adding same if in East longitude, but subtracting if in West longitude, and the answer will be the astronomical time at ship. To this latter add the mean sun's right ascension for Greenwich noon next preceding the time of sight, also add the correction from Table 3 (Nautical Almanac) for the number of hours and minutes from Greenwich noon; the result will be the local sidereal time. (L. S. T.) From the L. S. T. subtract the stars right ascension. The result will be the star's hour angle. With this hour angle enter the hour angle tables, Nautical Almanac, and find the corresponding correction. Apply this accordingly to its sign, plus or minus, to the star's true altitude. The result will be the latitude. Always North.

89.—**How do you find Latitude by a Planet?*

To the meridian altitude of the planet apply the corrections for dip, refraction and parallax, and subtract this true altitude from 90 degrees to obtain the zenith distance. Correct the planet's declination according to the time shown by chronometer at time of meridian passage, and apply same to the zenith distance, adding if of the same name, but subtracting between them if of different names, and the answer will be the latitude.

90.—*How do you find Latitude by the Moon?*

Correct the observed meridian altitude for semi-diameter, dip, refraction and parallax, then subtract the true altitude from 90 degrees to obtain the zenith distance. Next select the moon's declination for the Greenwich hour at time of sight (expressed astronomically), and correct same for the minutes over the hour, which corrected declination is to be applied to the zenith distance, adding same if they are of the same name, but subtracting if of different names, and the answer will be the latitude.

91.—**How would you find Latitude by a Fixed Star?*

Correct the observed altitude for dip and refraction, and subtract this true altitude from 90 degrees to find the zenith distance. From the Nautical Almanac take out the declination of the star and apply to the zenith distance following the same rules as for the other heavenly bodies.

92.—**What are Logarithms?*

They are numbers contrived to shorten the labor of multiplication and division by using in their place addition and subtraction.

93.—**How are Logarithms Used?*

In Navigation they are used the same as simple numbers, and are employed in cases of plane sailing and in working longitude by chronometer-altitude sights, etc. They are also used for extracting roots and raising numbers to any desired power.

94.—**What Advantage is Gained by their Use?*

They shorten the labor of multiplication or division of large sums, lessen the chances of mistakes, and enable us to work problems of higher mathematics with ease and saving of time.

95.—**How do You Find Longitude by Morning and Afternoon Time Sights?*

Observe the altitude of the sun and note the time by the chronometer, correct the observed altitude and apply the chronometer rate, then add together the true altitude, the latitude of the ship by dead reckoning, and the sun's polar distance at time of sight; next divide this sum by two, and from this half sum subtract the true altitude and note the remainder. Then select from Table 44 the logarithms secant of latitude, cosecant of polar distance, cosine of the half sum and sine of the remainder. Add these four logs together. This sum represents the log haversine

of the hour angle or the apparent time at ship when the sight was taken, and same will be selected from Table 45. Then apply to it the corrected equation of time so as to reduce it to the mean time at ship. The difference between this and the mean time shown at Greenwich when the sight was taken will give the longitude in time, and this converted into arc will be the longitude of the ship, named West if the G. M. T. is greater but East if G. M. T. is less than the ship's time.

96.—*How Do You Find Longitude by Equal Altitudes of the Sun?*

Observe an altitude of the sun about half an hour before noon, and note the chronometer; then wait until the sun falls to the same altitude after noon, and again note the chronometer. Half way between these two chronometer times will be the mean time at Greenwich when it was apparent noon at the ship. Now turn the Greenwich time into apparent time by applying the corrected equation of time for the given day, then the difference between the apparent noon at ship and the apparent time at Greenwich will be the longitude in time, and the same converted into arc will be the ship's longitude. In the interval between the two sights if the ship has sailed towards the sun, the first altitude must be increased as many minutes of arc as the ship has sailed miles; but if the ship has sailed away from the sun, the first altitude must be decreased that many miles. If the ship has sailed so as to alter her longitude, then

divide this by two and apply to the longitude by observation. This will be the longitude at noon.

97.—*How Do You Calculate the Negative Altitude?*

Add the refraction and dip together and call the sum *minus;* then add the semidiameter and parallax together and call the sum *plus.* Now subtract between the two quantities, and minus will result, which will be called the negative altitude for the lower limb. To obtain the negative altitude for the upper limb, add together the semidiameter, dip and refraction and subtract the parallax.

98.—*How Do You Find Longitude at Sunrise and Sunset?*

Note when the sun's lower or upper limb touches the horizon at rising or setting, and observe the time shown at that instant by the chronometer; then add together the latitude by dead reckoning and the sun's polar distance; next subtract the negative altitude (approximately 21′ for the sun's lower limb contact and 53′ for the sun's upper limb contact); divide by two, and add the negative altitude. From this part of the problem the logarithms are selected and the example is worked in precisely the same way as for a regular chronometer altitude sight.

99.—*Explain Sumner's Method.*

Sumner's Method is worked principally when the latitude by dead reckoning is uncertain. The rule is as follows: Assume two latitudes, one of them 30′ or 1° greater; and the other the same amount

less than the latitude by dead reckoning. Then observe a regular time sight of the sun and work it twice, using each time one of the assumed latitudes. Mark the two positions on the chart and connect them with a straight line. The ship will be somewhere on this line. Then wait until the sun changes its azimuth two or more points and take another time sight, which work twice as before with the same assumed latitudes. Mark these two positions on the chart also, and connect them with a straight line. The lines will cross and their intersection will show the position of the ship at the time of the first sight. If the ship has sailed a certain course after the first sight, then find the ship's position at the time of the second sight as follows: Project from the first position the true course and distance sailed, then draw a line through the point which will be parallel to the first line of position and where this line cuts the second line of position will be the place of the ship at the time of the second sight.

100.—*How Would You Find the Time of High Water and Low Water at a Given Place?*

In the Bowditch Epitome will be found the longitude of the given place, and also the lunar interval or tidal constant for high and low water. In the Nautical Almanac, page , against the given date, find the meridian passage of the moon (upper transit) and correct this for the longitude of the given place, adding if the longitude is West or subtracting if the longitude is East. The result will be the time of the moon's meridian passage at the given

place. To this add the high water constant if high water is required or low water constant if low water is required. Should this result in a tide later than the one required, this will indicate that the moon's meridian passage must be taken out for the preceding day or the time of lower transit calculated and then proceed as before.

101.—**How Would You Find Compass Deviation by an Amplitude?*

Observe the sun's bearing by compass, then select its true bearing from Table No. 39 (Bowditch); the difference between these two bearings will be the total error of the compass. Plot the two bearings on a compass, then if the true bearing is on the right hand side of the other the total error is Easterly, otherwise it is Westerly. Compare this with the variation given by the chart for the ship's position, and their difference will be the deviation of the compass for the course the ship was on when the sun's compass bearing was taken. To name this deviation, mark the total error and the variation on a compass card, and if the total error is to the right of the other, the deviation will be Easterly, but if to the left hand it will be Westerly.

102.—**How Would You Find the Deviation of the Compass by an Altitude Azimuth?*

Convert the observed altitude into a true altitude, then find the polar distance. Next add together the polar distance, true altitude and the latitude by dead reckoning, divide their sum by 2, and call the

result the half sum, from which subtract the polar distance, and note the remainder. Select the secant of the true altitude, secant of the latitude, cosine of the half sum, and the cosine of the remainder. The sum of these four logs will be the log haversine. Refer same to Table 45 Bowditch. Read the degrees and quarter degrees from the top of the page, the minutes and seconds are taken from the left hand column, this is the supplement of the azimuth; subtract this from 180 degrees, the result will be the true azimuth. The azimuth is reckoned from North in North Latitude, from South in South Latitude over East or West according to whether the celestial body is East or West of the meridian. The rule is the same for the sun, moon, planet and fixed stars.

Name total error as follows: refer both the compass bearing and the true bearing or azimuth to a compass card, and look at them from the center of the card, then, if the true bearing were seen to the right of the compass bearing, the total error would be Easterly; but if the true were seen to the left of the other it would be Westerly.

To name the deviation, mark the total error and the variation on a compass card, and if the total error were to the right of the other the deviation would be Easterly, but if to the left hand it would be Westerly.

103.—**How Would You Find Deviation of the Compass by Reciprocal Bearings?*

To obtain deviation by reciprocal bearings, a compass known as a landing compass is carried on shore and set up in a place where it is free from magnetic disturbance. A flag mounted on a staff is also

carried on shore, and this is used for signalling to the ship, and for allowing the observer on board to locate the shore compass as the ship is swung.

When the vessel's head is steadied on a certain point the signal flag on board is displayed immediately over the compass, and the observer on board at that instant takes a bearing of the flag ashore situated over the landing compass. At the same time he observer at the landing compass takes a bearing of the flag over the ship's compass.

After the swinging of the ship has been completed the bearings are compared and the difference between them gives at once the deviation for the ship's head on the respective compass points.

The shore bearings must have their signs reversed before comparison is made. For example: If the bearing of the ship's compass from the shore was N. 10° E., the same would be converted into S. 10° W., etc.

104.—**How Would You Find the Deviation of the Compass by a Distant Object?*

Find the correct magnetic bearing according to the chart of the selected distant object, then swing the ship. The difference between the bearing of the ship's compass, will be the deviation for the ship's head.

Refer the two bearings to a compass card, and if the bearing by chart compass were to the *left hand* of the other the deviation would be *Westerly* but if the bearing by chart compass were to the *right hand* the deviation would be *Easterly.*

105.—******What Ranges for Compass Adjusting or Finding the Deviation Could You Name in the Vicinity of New York and Other Familiar Waters?*

In the vicinity of New York use, for instance, New Drop of Elm Tree Beacon in line, bearing N. 49° W. True, or Sandy Hook Light in line with South Beacon bearing S. 67° E. True. Sandy Hook Light and Sandy Hook Beacon S. 12° E. or 168° True. Waackaack Beacon in line with Pt. Comfort Beacon, true bearing S. 70° W. or 250° True. Conover Beacon and Chapel Hill Beacon S. 6° W. or 186° True.

106.—******What is the Chief Thing to Guard Against When the Compass is Placed on Board Ship?*

A compass should be guarded against excessive deviation caused by proximity of any great amount of iron, such as funnels, masts, iron life-boats, life-rafts or movable iron objects. The Standard Compass should be placed so that the lubber lines fall in with the keel or center line of the ship.

107.—******By Which Chart Diagram Would You Shape the Course?*

By the magnetic diagram on the inland charts, allowing for deviation only, and the true diagram on ocean charts; for the latter allow for variation and

108.—******How Is Variation and Deviation of the Compass Applied?*

To convert a *compass* course into a *true* course, allow Westerly variation and Westerly deviation to

the left, Easterly variation and Easterly deviation to the right, assuming always that one stands in the center of the compass looking toward the circumference.

109.—**On What Principle is the Log Line Marked?*

The length of line between the knots has the same proportion to a nautical mile as the number of seconds of the sand glass has to one hour.

110.—**Show the Calculation of the Length of One Knot as Represented by the Log Line, Using a 14 Second Glass.*

The Nautical Mile is 6,080 feet in length, the number of seconds in one hour is 3,600, the proportion therefore is as follows:

$$3600 : 14 = 6080 : X$$

$$X = \frac{14 \times 6080}{3600} = 23 \text{ feet, 8 inches, nearly.}$$

111.—**What Motions has a Cyclone?*

A cyclone revolves around a supposed calm center with an increasing velocity as the center is approached. In the Northern hemisphere the progress of the center is along a line approximately W. N. W. until it reaches the vicinity of land when it generally turns in a Northerly direction and recurves towards N. E. and E. N. E., gradually expanding in diameter but decreasing in violence until it breaks up and disappears.

112.—*How Do You Find the Bearing of a Cyclone Center?

In the Northern hemisphere face the wind and count eight points to the right; in the Southern hemisphere face the wind and count eight points to the left. This will give an approximate direction of the cyclone center.

113.—*How Could You Avoid the Cyclone Center?

Look in the direction in which the storm is travelling in order to determine the semicircle in which you are. Then, if in the right semicircle in the Northern hemisphere, haul by the wind on the starboard tack, but if in the left semicircle, bring the wind on the starboard quarter, note the course, and keep to that course. In the Southern hemisphere, in the right semicircle, bring the wind on the port quarter, note the course and keep to it, but if in the left semicircle haul by the wind on the port tack.

Whether in the Northern or Southern hemisphere, if obliged to heave to, then, in the right semicircle heave to on the starboard tack, but in the left semicircle heave to on the port tack.

114.—*What are the General Indications of an Approaching Cyclone?

Threatening appearance of the weather with a sultry atmosphere, rugged appearance of the clouds, rapidly moving detached tufts of clouds across the sky, and rapidly falling barometer.

Converting Points into Degrees and Vice Versa

Points	Old System	New System
North	0	0
N by E	N 11° 15′ E	11° 15′
N N E	N 22° 30′ E	22° 30′
N E by N	N 33° 45′ E	33° 45′
N E	N 45° 00′ E	45° 00′
N E by E	N 56° 15′ E	56° 15′
E N E	N 67° 30′ E	67° 30′
E by N	N 78° 45′ E	78° 45′
East	N/S 90° 00′ E	90° 00′
E by S	S 79° 45′ E	101° 15′
E S E	S 67° 30′ E	112° 30′
S E by E	S 56° 15′ E	123° 45′
S E	S 45° 00′ E	135° 00′
S E by S	S 33° 45′ E	146° 15′
S S E	S 22° 30′ E	157° 30′
S by E	S 11° 15′ E	168° 45′
South	0	180° 00′

¼ point = 2° 48′ 45″ or approximately 3°

½ point = 5° 37′ 30″ or approximately 6°

¾ point = 8° 26′ 15″ or approximately 8°

Converting Points into Degrees and Vice Versa

Points	Old System	New System
South	0	180° 00′
S by W	S 11° 15′ W	191° 15′
S S W	S 22° 30′ W	202° 30′
S W by S	S 33° 45′ W	213° 45′
S W	S 45° 00′ W	225° 00′
S W by W	S 56° 15′ W	236° 15′
W S W	S 67° 30′ W	247° 30′
W by S	S 78° 45′ W	258° 45′
West	S/N 90° 00′ W	270° 00′
W by N	N 78° 45′ W	281° 15′
W N W	N 67° 30′ W	292° 30′
N W by W	N 56° 15′ W	303° 45′
N W	N 45° 00′ W	315° 00′
N W by N	N 33° 45′ W	326° 15′
N N W	N 22° 30′ W	337° 30′
N by W	N 11° 15′ W	348° 45′
North	0	360° 00′

Between 0 and 90° the course is N and E

Between 90° and 180° the course is S and E

Between 180° and 270° the course is S and W

Between 270° and 360° the course is N and W

To convert a *Compass* course into a *True* course—
Old System

Assume we stand in center of compass looking toward the circumference.
Allow Westerly Variation to the Left.
Allow Westerly Deviation to the Left.
Allow Easterly Variation to the Right.
Allow Easterly Deviation to the Right.
Leeway for Starboard Tack to the Left.
Leeway for Port Tack to the Right.

To convert a *True* course into a *Compass* course *reverse* the above rules.

To convert a *Compass* course into a *True* course—
New System

Westerly Variation and Westerly Deviation—Subtractive (—)
Easterly Variation and Easterly Deviation—Additive (+)
Leeway for Starboard Tack—Subtractive (—)
Leeway for Port Tack—Additive (+)
To convert a True course into a Compass course *reverse* the above rules.

SEAMANSHIP

115.—******Name the Engineer's Bells.*

One bell	Go ahead slow
Jingle bell additional . . .	Full speed ahead
One bell, if under full speed . .	Slow down
One bell additional	Stop
Two bells additional	Astern slow
Jingle bell additional . . .	Full speed astern

Whether going astern slow or at full speed, one bell always stops the engines.

If running under full speed, and the engineer receives four quick bells, it is a signal of emergency and means that the engines are to be reversed at full speed astern without waiting for the jingle bell.

116.—******What is the Engine Room Telegraph?*

An electrical or mechanical system of wires, indicators, etc., located in and between the pilot house, bridge and the engine room, and by means of which the orders for moving the engines are indicated on the dial.

117.—******How do You Mark a Lead Line?*

The hand lead line has nine marks and eleven deeps; the marks are as follows.

At 2 fathoms from the lead with 2 strips of leather.

At 3 fathoms from the lead with 3 strips of leather.

At 5 fathoms from the lead with a white rag.

At 7 fathoms from the lead with a red rag.

At 10 fathoms from the lead with leather with a hole in it.

At 13 fathoms from the lead witha blue rag or 3 strips of leather.

At 15 fathoms from the lead with a white rag.

At 17 fathoms from the lead with a red rag.

At 20 fathoms from the lead with two knots.

The deeps are unmarked fathoms. The deep sea lead is marked the same as the hand lead up to twenty fathoms, after which it is marked as follows:

At 25 fathoms with 1 knot.

At 30 fathoms with 3 knots.

At 35 fathoms with 1 knot.

At 40 fathoms with 4 knots.

At 45 fathoms with 1 knot.

At 50 fathoms with 5 knots.

And so on, the markings of the line are continued up to 100 fathoms.

118.—**How would you Heave a Steamer To in a Gale?*

There are several ways of doing this and it is dependent upon the size of the vessel, draught, etc. For a comparatively short, ordinary draught vessel, I would head her to the sea and keep the engines turning sufficiently fast to maintain steerage way, but not to drive her into it, otherwise she would ship heavy water forward. Another way is to take the seas almost three points on the bow so that her head may

keep lifting easily to the seas. To keep her in this position and prevent her head from falling off when the seas strike the bow, a little after canvas could be set. It has been demonstrated that if the engines are stopped and the vessel allowed to take her own position, she will quarter to the sea, so her propeller will act as a drag. This is rapidly growing to be a favorite way of heaving-to for a long, deep, screw steamer. She could also be hove-to under a drag either from the bow or quarter.

119.—**How would you Heave To with Disabled Machinery?*

I would heave to in the way just described or employ a drag or sea anchor.

021.—**Explain Use and Construction of a Drag?*

A drag is used to keep a ship's head to the sea. In construction it may either be a cornucopia, a kite or a spar drag. The cornucopia drag consists of a large iron ring with a long funnel-shaped canvas bag lashed to it. From the small end of this long bag a tripping line is bent to haul it inboard when desiring to put it out of use. A bridle of either three or four parts of rope is made fast on the large iron ring and from the centre of the bridle (the middle of the ring) a hawser is bent which leads either through the weather hawse pipe or through the bow check, or over the quarter.

The kite drag consists of the spars lashed or pinned through the centre, and around the extremities of the spars a chain is secured to keep them from closing and to weight the drag sufficiently to keep the

spars submerged. Sometimes a small kedge anchor or a length of chain is secured to the lower end of the spar for additional submerging purposes. A bridle is formed of four parts for a hawser to be bent into, and a tripping line is secured to the lower end of the spar to pull the kite inboard.

A single spar may be used as a horizontal drag by forming a bridle from end to end, into the sling of which a hawser is bent. To the centre of this spar a small kedge anchor is secured to hold it down in the water and give it resisting power. A tripping line is secured to one end of the spar.

121.—**How Would You Steer of Rudder Were Lost?*

There are various ways of doing this. One way would be to take a spar and bolt pieces of plank on to same so that that it would resemble the blade of an oar. It would then be launched over the middle of the taffrail with the blade end in the water and the upper part of the spar secured to the taffrail. The blade end would have hawsers attached to each side, and these hawsers would lead inboard over each quarter and have a watch-tackle attached to the inboard ends. A good weight would be used on the outboard end of the spar to keep this jury-rudder down in the water. By hauling on the tackles the blade end of this rudder could be swept from port to starboard, and vice versa, and the ship's head thereby controlled.

Another way is to let run a heavy hawser over the middle of the taffrail, with rope guys secured on the outboard end, and these are led inboard over the

quarters and hauled in as desired. A bight would thus be formed by the submerged end, which would act on the principle of a rudder.

Still another way is to take a vessel in tow, which latter, by signal from the vessel ahead, will port or starboard her helm as desired, and thus steer the vessel ahead.

It has been found by experience that a screw steamer with engines turning, and with lost or disabled rudder will walk right up to windward, provided no attention is paid to the steering of the vessel. The theory is that the screw naturally turns the vessel's head around until the bow is brought against the wind, which counterbalances the natural effect of the screw in swinging the ship's head, and under these conditions the steamer will keep walking to windward. This is of particular value in the case of a vessel meeting with an accident to her rudder when on a lee shore.

122.—**What is the Action of a Right-Handed Screw Propeller?*

A right-handed screw propeller revolves from the port to the starboard side of the ship during the upper part of the revolution while the engines are working ahead, and with the helm amidships tends to send a ship's head to the port side of her course, having he same effect as though she carried a starboard helm.. When the engines are working astern, it throws the ship's head to the starboard of her course.

You cannot cant a vessel's head to port with a right-handed screw propeller when going astern, as

no matter which way you put the helm she will go to starboard.

123.—**What is the Action of a Left-Handed Screw Propeller?*

A left-handed screw propeller revolves from the starboard to the port side of the ship during the upper part of its revolution while the engines are working ahead, and with the helm amidships it tends to throw the ship's head to starboard of her course. When the engines are working astern it tends to throw the ship's head to the port side of her course.

124.—**Before Getting Underway What Would You Do?*

Get a report from the engine room that everything is ready in that department; see that there is nothing foul of or likely to foul the propeller, and observe that the engine room bells, or telegraph, wheelropes and rudder are in working order.

125.—**Should You Run Aground, What Would You Do?*

Do not at once reverse the engines to back off, because, if the ship had injured herself badly she might sink after reaching deep water. Find out the amount of damage incurred, and whether she was likely to flat if backed off. If the latter, back her off, assisting her, if possible, with the kedge anchor carried out astern in one of the boats, having a long line bent on to it to heave on. If the vessel was not

likely to float, hold her to the ground by turning the engines ahead while getting out the boats.

126.—**How Would You Relieve Strain on the Cables?*

Steamers when lying at anchor in heavy weather can greatly relieve the strain on their cables by turning the engines over just fast enough for the purpose.

127.—**In a Narrow Channel How Would You Make a Short Turn?*

By making use of the jib or spanker, as the direction of the wind suggested.

128.—**How Would You Bring a Steamship to Anchor?*

If possible, acquaint the engineer some little time before coming to anchor so that the fires might be allowed to burn down, the pressure of steam relieved, and the necessity of blowing off avoided.

To anchor a steamship head on to the tide, slow down in good time, and when near the berth selected, stop, and reverse the engines, and when she begins to go astern, drop anchor and pay out the cable to the required amount.

To anchor a steamship when running with the tide give her a sheer after the engines have been stopped and her head-way lost, then drop the anchor, and she will not overrun her cable.

If there is but little tide or wind, run up to your anchorage, stop, then reverse engines so as to give her a little sternway, and drop anchor.

When through with the engines, signal to the engineer by any understood code between the bridge and the engine room.

129.—**How Would You Moderate the Racing of the Propeller?*

By never running the engines at full speed in a heavy sea, for when the propeller comes out of water by the elevation of the stern, the resistance of the blades ceases, the engines will race around, and the shaft will be in a danger of breaking.

130.—**How Much Chain Would You Pay Out in Anchoring?*

Ordinarily about three times as much chain as there is depth of water, where there is but little wind and tide; but this amount would be increased according to circumstances.

131.—**How Would You Handle a Leak?*

Upon springing a leak start all the pumps going, and if the vessel had water tight compartments, see all sluice gates closed. If the leak were near the water line, say on the starboard side, list her to port by all available means, so as to bring the injury into view. It might then be possible, in a wooden vessel, to nail sheet-lead or planking over it; but if an iron vessel, it must be stopped with the aid of a sail, or shored up from inside. If the leak were a dangerous one, and too far below the water-line to reach it from the outside, heave the ship to, take a strong sail, and after fastenings guys to each

quarter, pass the bights of the two lower guys under the keel with a lead bent on them to sink the rope, then haul taut all the guys, gradually drawing the sail down the side and along the bottom of the vessel, feeling for the leak, and when the sail is over it, the canvas will be sucked into the opening, and in all probability the leak will either be stopped or lessened. Always work the sail from forward towards aft. Now frap it down with good manilla rope passed from rail to rail under the keel and haul taut with tackles. In the case of a steamer carrying sail, and springing a leak in the vicinity of the water-line, the best thing in general is to put the vessel on a favorable tack, stop the engines and list her so as to raise the injured part as much as possible outof the water by moving all available weight to leeward, swinging out and filling up the lee boats with water by means of the deck deck pumps, and by filling up the lee boilers and drawing the fires and blowing off the water in the weather boilers. If in spite of all that had been done the vessel continued to leak dangerously, then, if in vicinity of land, try to gently beach her.

132.—**What Would You Do in Case of Fire?*

Ring the ship's bell rapidly as a fire quarters signal, then station a reliable man at the wheel; if the fire is forward put the ship before the wind, but if the fire is aft keep the ship to the wind. If powder is carried, flood the magazine. Now try to stifle the fire by shutting off and draught of air, or smothering it with wet blankets, etc., until the fire hose can be brought into play, or water drawn from over the side

by a bucket gang. If the fire breaks out from below, and is continually gaining headway, cover the hatches and lead the fire hose through a hole made in the deck, or break a pane of glass in the skylight. If, in spite of all that can be done, it is seen that the ship cannot be saved, then see the boats clear for lowering, and put into each a compass, breaker of water, bag of biscuits, provisions, blankets, oil-skins, a lantern, oil, matches, the boat's mast and sail, and such small stores as may be handy and useful while adrift in the boats, and station trustworthy men at the boatfalls until the boats are lowered into the water. The Captain's boat should be provided with the chronometer, sextant and chart, in addition to the rest of the stores. If, during the progress of the fire, the boats are seen to be in danger, then provision and equip them as above, and either let them drop astern by their painters, or let them lay off in a string to windward with a boatkeeper in charge, until they are required. The officers and crew are to assist the passengers to life saving equipments. If the vessel is near shore, and the fire gaining rapidly, then get the vessel into shallow water and open all sluices and sea cocks so as to scuttle her. The raising of the vessel may afterwards be effected.

133.—**How Would You Act if a Collision Were Threatened?*

If there were room for maneuvering, alter the helm as circumstances prompt, or go full speed astern. If it were seen that a collision was unavoidable, try to strike or to receive a glancing blow

instead of a head-on blow, as the latter would probably sink one or both vessels, while a glancing blow would be liable to expend its force above the waterline, and merely damage the boats, rail, davits, topsides, etc. The officers and crew must assist the passengers to life saving equipments after a serious collision.

134.—**What Would You Do After a Collision?*

At once see if the vessel were in danger of sinking, and if so, signal for assistance by the continuous blowing of the steam whistle, or by other means. Also see the boats ready for lowering and station the crew to prevent confusion and crowding, and order them to see that the passengers puton life preservers properly. If the vessel were near a favorable shore, and in danger of sinking, try to beach her. Also see to it that the fire hose were led along in case of fire breaking out on account of the collision, and make a point of standing by the other vessel if she needed any assistance.

135.—**What Do You Understand About Ground Tackle?*

It refers to the ship's bower-anchors, cables, spare anchors, kedge anchor, spare chain, windlass, anchor capstan, etc. In fact, it refers to all the gear used in the mooring of a vessel.

136.—**What Should a Steamer Do When Making Land?*

Keep a good lookout, and have the lead going.

If in a fog she should slow down the engines and keep the whistle going.

137.—**What is Dunnage?*

Loose pieces of short wood, also long lengths of wood, or other material, laid on the flooring of the ship to prevent injury to cargo by contact with water in the event of the ship leaking, and the rising of the water above the floor. Dunnage is used for

139.—**What Dunnage is Required in the Bigles, On* separating certain cargo and to prevent chafing, also for keeping the cargo secure.

138.—**How Would You Prepare a Ship's Hold for Receiving Cargo?*

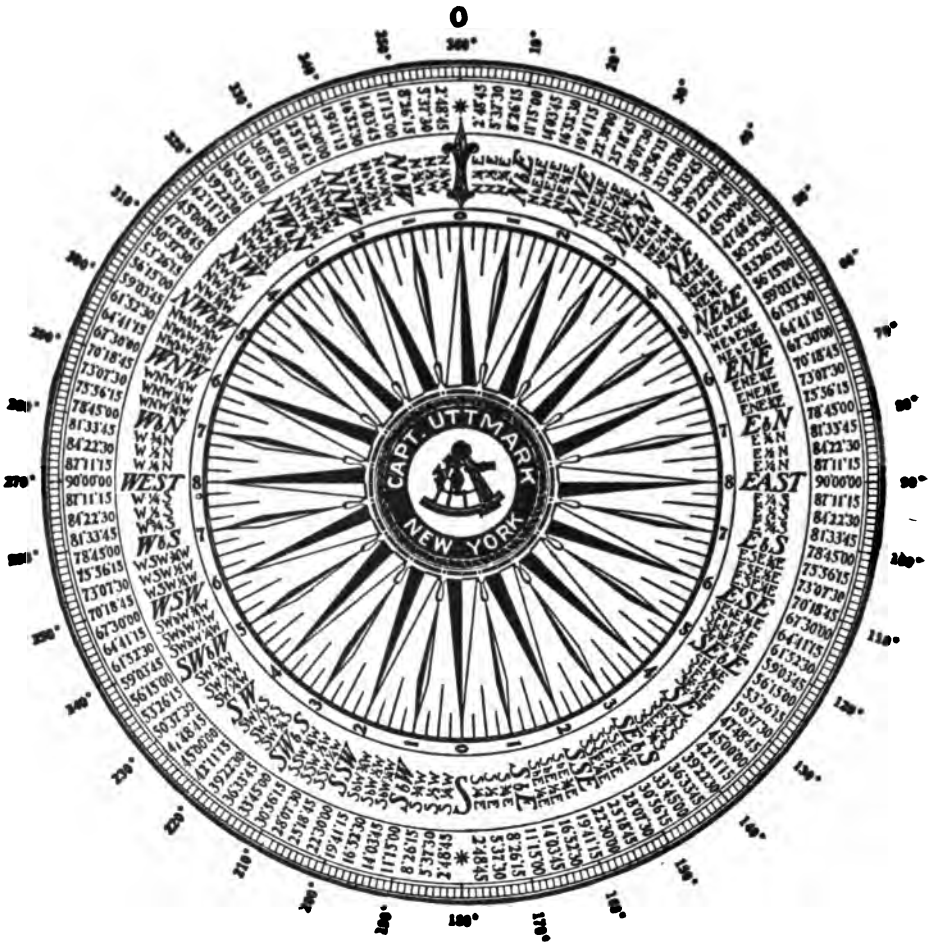
Sweep the hold clean and the remainder of the preparation would depend upon the character of the cargo to be taken on board. If it were coal or grain cargo, partition the hold by erecting bulkheads so that the cargo could not shift, and take care to keep the vicinity of the pump-wells clear, so as to guard against danger from choking. Also all sluice gates should be kept clear for closing as well as bunkhead doors, and before taking in cargo, the limbers should be clear, and the limber chain found to work freely.

139.—**What Dunnage is Required in the Bilges, On the Floors and On the Sides?*

In the bilges 14 inches, on the floors 9 inches, on the sides 4 inches, and in the 'tween decks 2 inches. Dunnage in the hold is to be laid fore-and-aft, and in the 'tween decks thwartships.

140.—***What Are the General Rules for Stowing Cargo?**

In stowing certain cargo, proceed as follows: In loading iron rails stow them fore and aft until they are level with the kelson, then grating fashion, and protect the sides of the ship by stowing rails fore and aft along the sides of the vessel. Secure the rails by laying the last three tiers solid, and then shoring and wedging them. If loading boxes and bales, stow bales on their flats amidships, with their marks and numbers up, but in the wing, stow them on their edge. Boxes and cases should also be stowed with their marks and numbers up. Inflamable stuff, such as oil, pitch, resin, etc., stow in the forepeak, and acids secure on deck so that they could be hove overboard quickly if necessary. Casks stow fore and aft with their bung up, and as the rivets on the hoops of the casks are in line with the bung, the sense of touch when stowing dirty casks in a dark hold tells at once when the bung is up.


CAPT. UTTMARK
NEW YORK

RULES OF THE ROAD

LIGHTS, FOG SIGNALS, WHISTLES, ETC.

141.—***Give the Lights for an Ocean Steamer Underway.**

On the starboard side a green light; on the port side a red light, and white masthead light. The side lights are fitted with inboard screens projecting three feet forward of the light, so that they cannot be seen across the bows. They show from right ahead to two points abaft the beam on their respective sides. The size of the glasses must be six by six inches, and these lights must be visible for at least two miles on a clear night. The masthead light must be carried on or in front of the foremast, not less than 20 feet above the deck; but if the beam of the vessel exceeds 20 feet, it must be carried at a height above the hull of not less than such beam. It must show from right ahead to two points abaft the beam on each side, and must be seen for five miles on a clear night.

A steam vessel when underway may carry an after light of the same character as the masthead light described, which shall be fifteen feet higher than the masthead light.

142.—*Give the Lights for a Sailing Vessel Underway.

The same character of side lights as prescribed for a steamer, but she shall carry no other lights.

143.—*Give the Lights for a Towing Vessel.

The side and masthead lights, and in addition an extra masthead light, six feet below the other, but in the same line. If towing more than one vessel, she shall carry an additional white light six feet below or above the others if the length of the tow, measuring from the stern of the towing vessel to the stern of the vessel being towed exceeds 600 feet. This third light must not be carried less than fourteen feet above the deck. The towing vessel may carry a small white light abaft the funnel or aftermast, for the vessel towed to steer by, but such light must not be visible forward of the beam.

144.—*What is the Light for a Vessel at Anchor?

A vessel under 150 feet in length shall carry forward where it can best be seen, at a height not more than twenty feet above the hull, a white light so constructed as to show a clear and unbroken light all around the horizon at a distance of at least one mile; but if the vessel exceeds 150 feet in length, she shall carry at a height of not less than twenty and not more than forty feet above the hull, such a light as just described, and at or near the stern of the vessel, another such light not less than fifteen feet lower than the forward light.

145.—***Give the Fog Signals for a Steamer Underway.**

A prolonged blast of the steam whistle at intervals not to exceed two minutes.

146.—***Give the Fog Signals for a Sailing Vessel Underway.**

When on the starboard tack one long blast of the fog horn; when on the port tack, two long blasts of the fog horn; when running with the wind abaft the beam, three blasts of the fog horn.

147.—***What is the Fog Signal for a Steamer Towing Another?**

One long and two short blasts.

148.—***Give the Fog Signals for a Vessel at Anchor.**

Ringing the ship's bell rapidly for five seconds at intervals not to exceed one minute.

149.—***What is the Law About the Size of Running and Anchor Lights?**

The glass in the side-lights shall be not less than 6 inches wide and 6 inches high. The glass globe of the anchor light shall be not less than 8 inches in diameter, which is equal to 24 inches in circumference. There is no law prescribed for the size of the masthead light, but it is provided that it must be of such character as to be visible for five miles on a clear night.

150.—*What Lights and Shapes are Shown by Vessel Not Under Command?

A vessel which from any accident or cause is not under command, shall show by night, well above the deck, where they can be seen all around the horizon for a distance of at least two miles, two red lights shown over one another, not less than six feet apart. By day, both sail and steam vessels not under command shall show two black balls or shapes, each two feet in diameter, one over the other, not less than six feet apart, and hoisted well above the deck where they may be seen all around the horizon.

151.—*What Lights Shall a Vessel Carry When Aground in a Fairway?

A vessel aground at night on or near a fairway shall carry the prescribed anchor light or lights and two red lights where they can be best seen, in a vertical line one over the other, not less than 6 feet apart, and of such a character as to be visible all around the horizon at a distance of at least 2 miles. In the day time, however, there shall be carried in a vertical line one over the other, not less than 6 feet apart, 2 black balls or shapes each 2 feet in diameter.

151*a*.—*What Are the Signals for a Vessel Laying or Picking up a Telegraph Cable?

A vessel employed in laying or in picking up a telegraph cable shall carry in the same position as a steam-vessel's masthead-light, and if a steam-vessel

in lieu of that light, three lights in a vertical line one over the other not less than 6 feet apart. The highest and lowest of these lights shall be *red*, and the middle light *white*, and they shall be of such a character as to be visible all around the horizon, at a distance of at least two miles. By day she shall carry in a vertical line, one over the other, not less than six feet apart, where they can best be seen, three shapes not less than two feet in diameter, of which the highest and lowest shall be globular in shape and *red* in color, and the middle one diamond in shape and *white*. When such vessel is not making way through the water, shall not carry side-lights, but when making way shall carry them.

152.—**Do the Rules of the Road at Sea Answer for Inland Waters?*

No; on inland water vessels are governed by the pilot rules prescribed for those waters. When ocean steam vessels enter pilotage waters, they are governed by the rules provided for said pilotage waters, and not by the rules of the road at sea.

153.—**What is a Stem Light?*

A bright white light carried in front of the stem by steamboats, tugs, and other mastless steam craft, navigating rivers and inland waters in general. This stem light must show from right ahead to two points abaft the beam on each side, and must be seen two miles.

154.—What is a Range Light?***

A seagoing steam vessel, when under way, may carry an additional white light similar to the masthead light. These two lights shall be so placed in line with the keel that one shall be at least fifteen feet higher than the other, and in such a posiion with reference to each other, that the lower light shall be forward of the upper one. The vertical distance between these two lights shall be less than the horizontal distance.

All steam vessels (except seagoing vessels and ferry boats) shall carry, in addition to the red and green side lights, a central range of two white lights; the after light being carried at an elevation at least fifteen feet above the light at the head of the vessel. The head light shall be so constructed as to show an unbroken light through twenty points of the compass, namely, from right ahead to two points abaft the beam on either side of the vessel, and the after light so as to show all around the horizon.

A vessel, when towing another vessel shall, in addition to its side lights, carry two bright white lights in a vertical line, one over the other, not less than three feet apart, and, when towing more than one vessel, shall carry an additional bright white light, three feet above or below such lights, if the length of the tow, measuring from the stern of the towing vessel to the stern of the last vessel towed exceeds 600 feet. Each of these lights shall be of the same construction and character and shall be carried in the same position as the steamer's masthead light or the after range light.

Such steam vessels may carry a small white light abaft the funnel or aftermast, for the vessel towed to steer by, but such light shall not be visible forward of the beam.

155.—**On Going Away From a Dock, What Would You Do?*

Blow a prolonged blast of the steam whistle as a warning to other vessels underway in my vicinity.

156.—**Upon Approaching a Bend in a River or Harbor, What Would You Do?*

Blow a prolonged blast of the steam whistle as a warning to other boats that might happen to be coming my way on the other side of the bend, and slow down engines until the bend was rounded.

157.—**In a Fog, What Extra Precautions Would You Take?*

Post a lookout, keep the whistle going, and slow down the engines. If making land, I would also keep the lead going.

158.—**What is the Alarm Whistle?*

Four short blasts of the steam whistle.

159.—**What is the Rule When Two Steamers Are Running in the Same Direction, and the One Astern Desires to Pass the One Ahead?*

Should the vessel astern desire to pass the one ahead on her right or starboard side, she shall give

one short blast of the steam whistle, and if the vessel ahead answers with one blast, then the vessel astern shall put her helm to port, and pass the other.

On the other hand, should the vessel astern desire to pass on the left or port side of the vessel ahead, she shall give two short blasts of the steam whistle, and if the vessel ahead answers with two blasts, then the vessel astern shall put her helm to starboard and pass the other.

If the vessel ahead does not think it safe for the vessel astern to attempt to pass, she shall signify the same by giving several short and rapid blasts of the steam whistle not less than four, and under no circumstances shall the vessel astern attempt to pass the vessel ahead until such time as it can be safely done, when the vessel ahead shall signify her willingness by blowing the proper passing signal to the vessel astern.

160.—*What is Cross-Signaling?*

The vessel ahead shall in no way attempt to cross the bow or crowd upon the course of the passing vessel.

Answering one blast with two blasts, or answering two blasts with one blast. Upon receiving such cross signal, blow the alarm whistle consisting of four short blasts.

161.—**What is the Rule for Vessels Meeting Obliquely?*

When two steam vessels are crossing, so as to involve risk of collision, the vessel which has the

other on her own starboard side, shall keep out of the way of the other.

The steamer which has the other on her own port side shall hold her course and speed, and the steamer which has the other on her own starboard side shall keep out of the way of the other by directing her course to starboard so as to cross the stern of the other, or if necessary, she shall slacken her speed, or stop, or reverse. The steamer which has the other on her own port bow shall blow one blast to show her intention of crossing the bow of the other, holding her course and speed, and said signal shall be promptly answered by the other steamer by one short blast to show her intention to direct her course to starboard so as to cross the other's stern, or likewise to keep clear. When this cannot be done, the danger signal of four short blasts shall be blown, and both steamers shall be stopped, and backed, if necessary, until passing signals are made and agreed upon. This comes under the head of Rule 8.

Rule 9 provides that when two steamers approaching each other at right angles, or obliquely, the steamer having the other on her own starboard side may cross the bow of the other if it may be done without involving risk of collision.

If the steamers are within half a mile of each other, the steamer having the other on her own starboard side shall give as a signal of her intention to cross the bow of the other, two short and distinct blasts, and if this is agreed to, she shall proceed, but if not agreed to by the other steamer the latter shall sound the danger signal of four short blasts, and both

steamers shall be stopped and backed if necessary, until passing signals are agreed upon.

162.—***On What Side of the Channel are Steamers to Keep?**

All steamers must keep to the right hand or starboard side of the channel, when it is possible to do so.

163.—***How Would You Signify Misunderstanding of Signals?**

By several short, quick toots of the steam whistle —not less than four.

164.—***What is the Rule When a Steam and a Sail Vessel Approach One Another?**

A steam vessel is always to keep out of the way of a sail vessel.

165.—***What are the Rules for Sailing Vessels Approaching One Another?**

Risk of collision may be ascertained by watching the compass bearing of an approaching vessel, and if the bearing of same does not appreciably change, such risk should be considered to exist, and one of them shall keep out of the way, as follows

(a) A vessel running free shall keep out of the way on one close-hauled.

(b) A vessel close-hauled on the port tack shall keep out of the way of a vessel close-hauled on the starboard tack.

(c) When both are running free with the wind on different sides, the vessel having the wind on the port side shall keep out of the way of the other.

(d) When both are running free with the wind on the same side, the vessel which is to windward shall keep out of the way of the vessel which is to leeward.

(e) A vessel which has the wind aft shall keep out of the way of the other vessel.

166.—**What Signal Do You Make for a Pilot?*

At night, a white light flashed above the bulwarks for a minute or so at a time, or by day, the pilot signal S., or the Jack hoisted to the fore.

167.—**What are Signals of Distress?*

When a vessel is in distress and requires assistance from other vessels (or from the shore) the following signals should be displayed by her, either together or separately:

In the Daytime.—A gun, or other explosive signal fired at intervals of about a minute.

The International Code Signal of Distress indicated by "N. C."

The Distant Signal, consisting of a square flag, having either above or below it a ball, or anything resembling a ball.

A continuous sounding with any fog signal apparatus.

In the Night Time.—A gun or other explosive signal fired at intervals of about a minute.

Flames on the vessel (as from a burning tar or oil barrel, etc.)

Rockets or shells, throwing stars of any color or description, fired one at a time at short intervals.

A continuous sounding with any fog signal apparatus. A blue light burned every few minutes.

168.—**Where Must the Name of a Steam Vessel be Painted?*

On the stern and on each side of the pilot house of a screw steamer, but on the outer side of the paddle boxes of a side wheel steamer. The name may also be painted on the bows.

169.—**What Size Must the Letters Measure?*

Not less than 6 inches on pilot and wheel house, and not less than 3 inches on the stern, but the size is optional on the bows.

170.—**What Character of Letter Must They Be?*

Either a painted or a raised letter.

171.—**What Color Letter and on What Color Ground?*

The letters on the stern must be either white, yellow or gold, and must be on a black ground. The color for the letters on the pilot house, bows, and paddle boxes is left optional; but they must be plain and distinct.

172.—**What Else Besides the Ship's Name Must be on the Stern?*

The hailing port of the vessel must also show on the stern.

173.—**How Could You Signal an Alarm of Fire to the Engine Room?*

By means of the speaking tube, or the continuous sounding of the jingle-bell or gong, or the continuous blowing of the steam whistle.

174.—**How Should a River or Sound Steamer be Loaded?*

All acids, spirits, paints, oils and other dangerous cargo should be carried on the open deck where it might be thrown overboard quickly in case of fire. Goods that were to be kept dry, stow under cover, provided they were not of a specially dangerous character. Barrels and casks should bestowed head up to prevent rolling about or fetching away.

175.—**How Should Hay be Carried an on Inland Steamer?*

All hay, straw, or other inflammable material carried on the open deck of any steamer carrying passengers shall be covered with a tarpaulin.

All baled cotton shall be securely bound and covered with bagging on at least three-fourths of its surface, including both ends of the bale. No bales of imported or domestic hemp shall be received on any vessel carrying passengers unless the same are prop-

erly compressed, bound with rope, wire or metallic bands, and covered on ends or sides, according to the several methods now practiced in foreign and domestic trade.

176.—**How Should Barrels of Liquor be Stowed on an Inland Steamer?*

Away from fire or excessive heat, and so disposed as to be quickly got at and rolled overboard in case of fire. They should be stowed on end so that they might not get rolling around with the motion of the vessel, and thereby start a leak.

177.—*What is the Rule for Inflammable Oil?*

None of the inflammable articles specified in Section 4472, Revised Statutes, or oil that will not stand a fire test of 300° F. shall be used as stores on any pleasure steamer or steamer carrying passengers, except that vessels not carrying passengers for hire may transport gasoline or any of the products of petroleum for use as a source of motive power for the motor boats or launches of such vessels.

Refined petroleum which will not ignite at a temperature of less than 110° F. may, upon routes where there is no other practicable mode of transporting it, be carried on passenger steamers; but it shall not be lawful to receive on board or transport any petroleum unless the owner or master of the steamer shall have first received from the inspectors a permit designating the place or places on such steamer in which the same may be carried or stowed, with the further

condition that the permit shall be conspicuously posted on the steamer.

Refined petroleum shall not in any case be received on board or carried unless it is put up in good ironbound casks or barrels or in good metallic cans, or vessels carefully packed in boxes and the casks, barrels, or boxes plainly marked on the heads thereof with the shipper's name, the name of the article, and the degree of temperature (Fahrenheit) at which the petroleum will ignite.

178.—**What is the Penalty for Keeping a Light Over the Side?*

Suspension or revocation of license.

179.—**What is the Penalty for Flashing the Rays of a Searchlight into the Pilot House of a Passing Vessel?*

Suspension or revocation of license.

180.—**What is the Penalty for Unnecessary Sounding of the Steam Whistle Within any Harbor in the U. S.?*

Suspension of license.

181.—**What Light May Be Carried in Addition to the Side and Masthead Lights?*

A seagoing Steam Vessel when underway may carry an additional white masthead light, and these two lights shall be placed in line with the keel, and one shall be at least 15 feet higher than the other, and the lower light shall be forward of the up-

per light. This additional light is called *range light*, because it is in range with the regular masthead light. The vertical distance between these lights shall be less than the horizontal distance.

182.—**Is the Range Light Compulsory?*

Not on seagoing steamships, as the law reads that it *may* be carried; but the law also prescribes that all steam vessels, except seagoing vessels and ferryboats, shall carry in addition to the regular sidelights a central range of two white lights, the after one to be carried at an elevation of at least 15 feet above the light at the head of the vessel. The headlight must show an unbroken light through 20 points of the compass, from right head to 2 points abaft the beam on either side and the after light to show all around the horizon.

183.—**What Do You Understand by a Range Light Screen Board?*

This is not compulsory, but it is employed on some vessels. The screen is a horizontal board, placed under the range light in order to prevent the rays of light from shining down on the bridge and bow of the vessel, thereby blinding the officers on the bridge and the man on lookout.

184.—**What is an Efficient Fog Bell?*

The efficient fog bell required upon vessels by law shall be held to mean a bell not less than 8 inches in diameter from outside to outside, and constructed of bronze or brass or other material equal thereto in tone and volume of sound and located where the sound shall be the least obstructed.

185.—***What are the one, two, three and four Flag Signals of the International Code?**

The *one flag* signal is an *attention signal,* such as answering or code pennant, C, yes; D, no; etc.

The *two flag* signals are *urgent* or *important* signals.

The *three flag* signals are *General Vocabulary,* Time, Latitude, Longitude, Compass Points, etc.

The *four flag* signals are *Geographical Signals, vessel's name* and the *alphabetical spelling table.*

Meanings of One Flag Signals and Pennants Hoisted Singly

Signal—Meaning
B—I am taking in (or, discharging) explosives.
C—Yes, or, Affirmative.
D—No, or, Negative.
L—I have (or have had) some dangerous infectious disease on board.
P—I am about to sail; all persons to report on board.
Q—I have a clean bill of health, hut am liable to quarantine.
S—I want a pilot.

186.—***What is the Meaning of Code Flag Over E, F, and G?**

Code flag over E is the Alphabetical Signal No. 1, indicating that the flags hoisted after it until Alphabetical Signal No. 3 or Numeral Signal No. 1 is made, do not represent the signals in the Code, but are to be understood as having their alphabetical meanings and express individual letters of the alphabet which are to form words.

Code flag over F is the Alphabetical Signal No. 2, indicating the end of a word made by Alphabetical Signals, or dot between initials.

Code flag over G is the Alphabetical Signal No.

3, indicating that the Alphabetical Signals are ended; the signals which follow are to be looked out in the Code in the usual manner.

187.—**What is the Meaning of the Code Flag Over M, N, and O?*

Code flag over M is the Numeral Signal No. 1, indicating that the flags hoisted after it, until Numeral Signal No. 3, or Alphabetical Signal No. 1 is made, do not represent the signals in the Code, but express figures, as indicated in the Numeral Table, and have the special numerical values given to them.

Code flag over N is the Numeral Signal No. 2, indicating the Decimal Point.

Code flag over O is the Numeral Signal No. 3, indicating that the Numeral Signals are ended; the signals which follow are to be looked out in the Code in the usual manner.

188.—**What is the Meaning of the Code Flag Over Any One Flag?*

The Code Flag over any one flag is a *special signal*, such as over A, "I am on full speed trial"; over C, "Yes"; over D. "No," etc., see below:

Code Flag
Over
A——I am on full speed trial.
B——I am taking in (or, discharging) explosives.
C——Yes, or, Affirmative.
D——No, or, Negative.
E——Alphabetical Signal No. 1.
F——Alphabetical Signal No. 2.
G——Alphabetical Signal No. 3.
H——Stop, Heave-to, or, Come nearer; I have something important to communicate.

Code Flag
Over
I—I have not a clean bill of health.
J—I have headway.
K—I have stern-board.
L—I have (or have had) some dangerous infectious disease on board.
M—Numeral Signal No. 1.
N—Numeral Signal No. 2.
O—Numeral Signal No. 3.
P—I am about to sail; all persons to report on board.
Q—I have a clean bill of health, but am liable to quarantine.
R—Do not pass ahead of me.
S—I want a pilot.
T—Do not overtake me.
U—My engines are stopped.
V—My engines are going astern.
W—All boats are to return to the ship.
X—I will pass ahead of you.
Y—All ships of the convoy are to rejoin company.
Z—I will pass astern of you.

International Code Signals of Distress

1. The International Code Signal of Distress indicated by NC.

2. The distant signal, consisting of a square flag, having either above or below it a ball or anything resembling a ball.

3. The distant signal, consisting of a cone point upward, having either above it or below it a ball or anything resembling a ball.

For other signals of distress see International and Inland Rules to Prevent Collisions.

International Code Signals for a Pilot

1. The International Code Pilot Signal indicated by PT.

2. The International Code Flag S, with or without the Code Pennant over it.

3. The distant signal, consisting of a cone point upward, having above it two balls or shapes resembling balls.

189.—**Explain the Storm Warning Signals.*

Small Craft Warning.—A red pennant indicates that moderately strong winds are expected.

Storm Warning.—A red flag with a black centre indicates that a storm of marked violence is expected. The pennants displayed with the flags indicate the direction of the wind; red, easterly; white, westerly. The pennant above the flag indicates that the wind is expected to blow from northerly quadrants; below, from southerly quadrants.

By night a red light indicates easterly winds, and a white light below a red light, westerly winds.

Hurricane Warning.—Two red flags with black centers displayed one above the other, indicate the expected approach of a tropical hurricane, or one of those extremely severe and dangerous storms which occasionally originate in the West Indies or Gulf region and move northward along the Atlantic coast line.

Neither small craft nor hurricane warnings are displayed at night. (See flags in colors in front of book.)

190.—**What are Life-Saving Signals?*

1. Upon discovery of a wreck by night, the life-saving force will burn a red pyrotechnic light, or a red rocket, signifying: *"You are seen; assistance will be given as soon as possible."*

2. A red flag waved on shore by day, or a red light, red rocket, or red Roman candle at night, will signify: "Haul away."

3. A white flag waved on shore by day, or a white light swung back and forth, or a white rocket or white Roman candle at night, will signify: "Slack away."

4. Two flags, a white and red, waved at the same time on shore by day, or two lights, a white and red, slowly swung at the same time, or a blue pyrotechnic light burned by night, will signify: *"Do not attempt to land in your own boats; it is impossible."*

5. A man on shore beckoning by day, or two torches burning near together by night will signify: *"This is the best place to land."*

191.—**Describe the Use of the Gun and Rocket Apparatus and Breeches Buoy.*

If your vessel is stranded and a shot with a small line is fired over it, get hold of the line and haul on board until you get a tail-block with an endless line rove through it; make the tail-block fast to the lower mast, well up, or in the event the masts are gone, to the best place to be found; cast off small shot line, see that rope in block runs free, and make a signal to shore (Fig. 44).

A hawser will be bent to the endless line on shore and hauled off to your ship by the life-saving crew. Make hawser fast about 2 feet above the tail-block and unbend hawser from endless line. See that rope in block runs free and show signal to shore (Fig. 45).

Life-savers on shore will then set hawser taut and by means of the endless line haul off to your ship a breeches buoy (Fig. 46).

Let one man get clear into the breeches buoy, thrusting his legs through the breeches; make a signal to shore as before, and he will be hauled ashore by the life-savers and the empty buoy returned to the ship.

Fig. 44

Fig. 45

Fig. 46

SHIP'S BUSINESS.

RULES FOR THE PRESERVATION OF LIFE, PASSENGER STEAMERS, ETC.,

OCEAN STEAMERS

1. Under this designation shall be included all steam vessels navigating the waters of any ocean or the Gulf of Mexico more than 20 nautical miles offshore.

For the purpose of apportioning lifeboat, liferaft, and davit equipment upon ocean steam vessels subject to the jurisdiction of the Steamboat-Inspection Service, they shall be divided into the following classes:

(a) Passenger steam vessels.

(b) Passenger steam vessels, the keels of which are laid after July 1, 1915.

(c) Cargo steam vessels and all other steam vessels navigating the waters of any ocean, unless otherwise provided for.

COASTWISE STEAMERS

1. Under this designation shall be included all steam vessels navigating the waters of any ocean or the Gulf of Mexico 20 nautical miles or less offshore.

For the purpose of apportioning lifeboat and

life-raft equipment upon coastwise steam vessels subject to the jurisdiction of the Steamboat-Inspection Service, they shall be divided into the following classes:

(a) Passenger steam vessels.

(b) Passenger steam vessels, the keels of which are laid after July 1, 1915.

(c) Cargo steam vessels and all other steam vessels unless otherwise provided for.

192.—**What is the Duty of a Master and Mate when First Joining His Vessel?*

The Master should see that the vessel is fully found and provided as regards coal, provisions, water, anchors, boats, fire-hose, compasses, chronometers, sextants, charts, etc. He should see that the ship's articles are made out in proper manner; that the crew and officers are drilled at fire quarters, and that all boats are ready for immediate lowering; also that the sluice gates are in working order, and water tight compartments safe. The Master also has charge of the ship's papers and the clearance and entrance of the vessel at the Custom House.

The Mate should have an inventory of everything under his charge, which will include the carpenter's and boatswain's stores, tools, etc. He is responsible for the good working of the windlass, the condition of the boats, boat-falls, cat-falls running and standing rigging, sails, sail-covers, awnings, etc. It is his duty to see that the carpenter attends to the sluices, and sounds the water-tank and the well,

night and morning. When entering or leaving port, the Chief Mate's place is on the forecastle, superintending bow lines, anchors, etc.

193.—*What is the Duty of a Master to Report to the Local Inspector?*

All accidents involving damage to property or loss of life or injury to any one on board; fire; neglect of duty on the part of a subordinate; collisions; refusal of another vessel to answer signals, etc. He will also report, as the time draws near, the date of the expiration of the license of the vessel, and make a written request for the annual inspection and yearly licensing of his ship.

194.—**What is the Penalty According to Law for Officers Who Fail to Keep the Rules Prescribed for the Running of the Vessel, also for Failure to Keep Everything on Board Ship in Good Working Order?*

Suspension or revocation of license or imprisonment.

195.—**What is a Station Bill, and Where is it Required to be Exhibited?*

It shall be the duty of the officer in charge of every steamer carrying passengers to cause to be prepared a station bill for his own department, and one also for the engineer's department, in which shall be assigned a post or station of duty for every person employed on board such steamer in case of fire or other disaster, which station bills shall be placed in

the most conspicuous places on board for the observation of the crew. And it shall be the duty of such master, or of the mate or officer next in command, once at least in each week, to call all hands to quarters and exercise them in the discipline, and in the unlashing and swinging out of the lifeboats, weather permitting, and in the use of the fire pumps and all other apparatus for the safety of life on board of such vessel, with especial regard for the drill of the crew in the method of adjusting life-preservers and educating passengers and others in this procedure and to see that all the equipments required by law are in complete working order for immediate use; and the fact of the exercise of the crew, as herein contemplated, shall be entered upon the steamer's log book, stating the day of the month and hour when so exercised; it shall be the duty of the inspectors to require the officers and crew of all such vessels to perform the aforesaid drills and discipline in the presence of the said inspectors at intervals sufficiently frequent to assure the said inspectors by actual observation that the foregoing requirements of this section are complied with; the master shall also report monthly to the local inspectors the day and date of such exercise and drill, the condition of the vessel and her equipment, and also the number of passengers carried, and any neglect or omission on the part of the officer in command of such steamer to strictly enforce this rule shall be deemed cause for the suspension or revocation of the license of such officer.

The *general* fire-alarm signal shall be a continuous rapid ringing of the ship's bell for a period

of not less than 20 seconds, and this signal shall not be used for any other purpose whatsoever. The master of any steamer carrying passengers may establish such other emergency signals, in addition to the ringing of the ship's bell, as will provide that all the officers and all the crew of the steamer will have positive and certain notice of the existing emergency.

Three copies of this section shall be furnished every steamer carrying passengers, to be framed under glass and posted in conspicuous places about the vessel.

196.—**How Would You Test a Life-Preserver?*

Every vessel inspected under the provisions of Title LII, Revised Statutes of the United States, shall be provided with one good life-perserver, having the approval of the Board of Supervising Inspectors, for each and every person carried.

Every life-preserver adjustable to the body of a person shall be made of good cork blocks or other suitable material approved by the Board of Supervising Inspectors, with belts and shoulder straps properly attached, and shall be so constructed as to place the device underneath the shoulders and around the body of the person wearing it. All such life-preservers shall be not less than 52 inches in length when measured laid flat; and every cork life-preserver shall contain an aggregate weight of at least 5½ pounds of good cork, and every life-preserver shall be capable of sustaining for a continuous period of 24 hours an attached weight so arranged that whether the said weight be submerged or not there shall be a direct

downward gravitation pull upon said life-preserver of at least 20 pounds.

197.—**Where Would You Stow Wines and Spirits?*

Away from any place where there was connection in any way with fire or excessive heat.

198.—**How Often on Board Ship is a Boat and Fire Drill Required by Law?*

At least once in each week.

199.—**What Cargo is Prohibited by Law on Passenger Steamers?*

Loose hay, loose cotton, loose hemp, camphene, nitro-glycerine, naphtha, benzine, benzole, coal-oil, crude or refined petroleum, or other like articles; nor shall baled cotton or hemp be carried unless the bales are compactly pressed and thoroughly covered, and secured in such manner as shall be prescribed by the Board of Supervising Inspectors; neither shall gunpowder be carried except under special license, nor shall oil of vitrol, nitric, or other chemical acids be carried except on the decks or guards thereof, or in such other safe part of the vessel as shall be prescribed by the Inspectors. Refined petroleum of 110 degrees proof may be carried, also oil in spirits of turpentine, when put up in good metallic vessels bound with iron and stowed in a secure part of the vessel. Friction matches may be carried when securely packed in strong, tight chests or boxes, and stowed in a safe part of the vessel at a secure distance from any fire or heat.

200.—**How Would You Put On a Life-Preserver?*

Put the straps over the shoulders, and fasten the belt around the waist, so as to hold the jacket tight and to prevent it from working away when in the water.

201.—**What Equipment is Required by Law for Lifeboats?*

All lifeboats on ocean vessels shall be equipped as follows:

A properly secured life line the entire length on each side, festooned in bights not longer than 3 feet, with a seine float in each bight.

One painter of manila rope of not less than 2¾ inches in circumference and of suitable length.

A full complement of oars and two spare oars.

One set and a half of thole pins or rowlocks attached to the boat with separate chains.

One steering oar with rowlock or becket and one rudder with tiller or yoke and yoke lines.

One boat hook attached to a staff of suitable length.

Two life preservers.

Two hatchets.

One galvanized iron bucket with lanyard attached.

One bailer.

Where automatic plugs are not provided there shall be two plugs secured with chains for each drain hole.

One efficient liquid compass with not less than a 2-inch card.

One lantern containing sufficient oil to burn at

least nine hours and ready for immediate use.

One can containing 1 gallon of illuminating oil.

One box of friction matches wrapped in a waterproof package and carried in a box secured to the underside of the stern thwart.

A wooden breaker or suitable tank fitted with a siphon, pump, or spigot for drawing water, and containing at least 1 quart of water for each person.

Two enameled drinking cups.

A water-tight receptacle containing 2 pounds avoirdupois of provisions for each person. These provisions may be hard bread or United States Army ration. The receptacle shall be of metal, fitted with an opening in the top not less than 5 inches in diameter, properly protected by a screw cap made of heavy cast brass, with machine thread and an attached double toggle, seating to a pliable rubber gasket, which shall insure a tight joint, in order to properly protect the contents of the can.

One canvas bag containing sailmaker's palm and needles, sail twine, marline, and marline spike.

A water-tight metal case containing 12 self-igniting red lights capable of burning at least two minutes.

A sea anchor.

A vessel containing 1 gallon of vegetable or animal oil, so constructed that the oil can be easily distributed on the water and so arranged that it can be attached to the sea anchor.

A mast or masts with one good sail at least and proper gear for each (this does not apply to motor lifeboats), the sail and gear to be protected by a suitable canvas cover. In case of a steam vessel which

carries passengers in the North Atlantic and is provided with a radiotelegraph installation, all the lifeboats need not be equipped with masts and sails. In this case at least one of the boats on each side shall be so equipped.

All loose equipment must be securely attached to the boat to which it belongs.

Lifeboats of less than 180 cubic feet capacity on pleasure steamers are not required to be equipped as above.

202.—**What is the Equipment Required on Life Rafts?*

All life rafts on ocean steam vessels shall be equipped as follows:

A properly secured life line entirely around the sides and ends of the raft, festooned to the gunwales in bights not longer than 3 feet with a seine float in each bight.

One painter of manila rope of 2¾ inches in circumference, and of suitable length.

Four oars.

Five rowlocks properly attached.

One boat hook attached to a staff of suitable length.

One self-igniting life-buoy light.

One sea anchor.

A vessel containing 1 gallon of vegetable or animal oil, so constructed that the oil can be easily distributed on the water, and so arranged that it can be attached to the sea anchor.

A water-tight receptacle containing 2 pounds avoirdupois of provisions for each person. These

provisions may be hard bread or United States Army ration. The receptacle shall be of metal and fitted with an opening in the top not less than 5 inches in diameter, properly protected by a screw cap made of heavy cast brass, with machine thread and an attached double toggle, seating to a pliable rubber gasket, which shall insure a tight joint, in order to properly protect the contents of the can.

A water-tight receptacle containing 1 quart of water for each person.

Two enameled drinking cups.

A water-tight metal case containing six self-igniting red lights capable of burning at least two minutes.

A water-tight box of matches.

All loose equipment must be securely attached to the raft to which it belongs.

203.—**Carrying Capacity of Lifeboats.*

The capacity of all lifeboats not otherwise provided for shall be determined by the following rule: Measure the length and breadth outside of the planking or plating and the depth inside of the place of minimum depth. The product of these dimensions multiplied by .6 resulting in the nearest whole number shall be deemed the capacity in cubic feet.

To determine the number of persons a boat is to carry, divide the result by 10 for ocean steamers.

Example:

The carrying capacity of a boat 22 feet in length, 6 feet in breath, and 2½ feet in depth shall be determined as follows:

For ocean steamers,

$$\frac{22 \times 6 \times 2\frac{1}{2} \times .6}{10} \quad \frac{198}{10} = 19 \text{ persons}$$

Every lifeboat shall have sufficient room, freeboard, and stability to safely carry the number of persons allowed to be carried by the above rule, which fact shall be determined by actual test in the water at the time of the first inspection of the lifeboat, except that where a vessel is carrying lifeboats of different types or capacities, at least one lifeboat of each type or capacity shall be so tested.

At every annual inspection of a vessel carrying passengers, except ferryboats, every lifeboat shall be tested by being lowered to the water, or to a wharf where a boat can not be lowered to the water; and, after the boat has been lowered to the water or to a wharf, it shall be lifted clear of water or wharf by its respective blocks and falls with boat loaded to allowed capacity, with load evenly distributed throughout the length of the boat.

In making the tests of lifeboats as required in this section, the weight of a person shall be taken as 140 pounds.

Lifeboats required on ocean vessels of 150 gross tons and over shall be of suitable dimensions and of not less than 180 cubic feet capacity.

204.—*What are the Rules for Line-Carrying Guns, Rockets and Equipment?*

All ocean steam pleasure vessels and ocean steam vessels carrying passengers, except vessels of 150 gross tons and under, shall be provided with at least

three line-carrying projectiles and the means of propelling them, such as may have received the formal approval of the Board of Supervising Inspectors.

When approved rockets are used instead of guns there shall be, in every case, at least three of said rockets, and all steamers that are required under the law to carry line-carrying projectiles and the means of propelling them shall be supplied auxiliary thereto with at least 800 feet of 3-inch manila line for vessels of over 150 and not under 500 gross tons and 1,500 feet of said line for steamers above 500 gross tons; and except where approved rockets are provided, with three approved service projectile lines and three projectiles. Such auxiliary line and all other equipment shall be kept always ready for use in connection with the gun and rocket, which lines and other equipment shall not be used for any other purpose.

The test rounds required shall be fired from the gun when mounted on its own carriage, lashed as it would be in shipboard use.

The line shall be coiled, faked or reeled in its own faking box, or reel; and the gun, carriage, line box, or reel, and the projectiles shall all bear the same number, and shall be initialed by the inspector, whose report of the test, giving number, date, and result, shall be filed in the office of the supervising inspector of the district in which the test is made.

205.—*What Drill is Required for Line-Carrying Gun?*

The master of every vessel equipped with a line-

carrying gun shall drill his crew in the use thereof and fire said gun at least once in every three months, using one-half of the usual charge of powder and any ordinary line of proper length.

It shall be the duty of the inspectors, at the annual inspection, to see that these drills are entered on the log of the vessels.

A placard containing instructions for using the gun and rocket apparatus required by the foregoing section and as practised by the United States Life-Saving Service shall be posted in the pilot house, engine room, and in the seamen's, firemen's and steward's department of every steam vessel required by law to carry such gun or rocket apparatus.

206.—**What are the Rules for Ring Buoys?*

Whenever they deem it necessary for the safety of passengers or crews, inspectors may require a vessel to carry not to exceed four ring buoys, either with or without attached lines. It is recommended that ring buoys hung on a steamer's gangways have the line attached to both the vessel and the buoy, and that those hung on the superstructure have no line and be as light as it is possible with the necessary buoyancy.

207.—**What Materials are Prohibited for Use In Life-Preservers?*

All life-rafts and life-preservers made in whole or in part of loose granulated cork shall be excluded from use on all vessels.

All kapok life-preservers heretofore approved by the Board of Local Inspectors shall be excluded from use on all vessels.

208.—**What Are the Rules for Storm Oil?*

On and after August 1, 1914, ocean and coastwise steam vessels of over 200 gross tons navigating the waters of the Atlantic and Pacific coasts and the waters of any ocean or gulf shall be equipped with oil tanks having suitable pipes attached for distributing oil overboard whenever conditions make same necessary.

Steamers of over 200 and not over 1,000 gross tons shall be provided with two oil tanks of at least 15 gallons capacity each.

Steamers of over 1,000 and not over 3,000 gross tons shall be provided with two oil tanks of at least 20 gallons capacity each.

Steamers of over 3,000 and not over 5,000 gross tons shall be provided with two oil tanks of at least 25 gallons capacity each.

One of these tanks shall be placed in the forward and the other in the after part of the vessel, and the pipes from said oil tanks shall be led overboard on both sides of the vessel. Tanks shall be kept filled with animal or storm oil and ready for use at all times when vessel is being navigated.

209.—**What is the Rule for Vessel's Name on Equipment?*

All the equipments of a steamer, such as buckets, hose, axes, boats, oars, rafts, life-preservers, floats, barrels, and tanks, shall be painted or branded with the name of the steamer upon which they are used.

210.—******What is the Penalty for Navigating a Boat Outside of the Waters for Which She is Licensed?*

The revocation of her license by the Local Inspectors.

211.—******What is the Penalty for the Officer for Navigating a Boat Outside the Waters for Which He is Licensed?*

The revocation of his license as an officer, or be punished by fine or imprisonment.

212.—*What Special Monthly Report Shall a Master Make?*

The day and date of fire and boat drill; the condition of the vessel and her equipment, particularly as to life-saving appliances; also a number of passengers carried during the month.

213.—******What are a Master's Duties When His Vessel is Under Annual Inspection?*

To remain on board in order to assist the Local Inspectors in the testing of the hull, boilers, etc., also to get out for inspection all fire appliances, life-preservers, etc., and to answer all questions truthfully that the Inspectors may ask about the vessel and her equipment.

214.—******What is a Bill of Lading?*

A receipt given for cargo received on board or alongside. It is signed by the master, mate or clerk of the vessel.

215.—**What is a Manifest?*

A paper showing all of the cargo on board, together with the ship's stores, articles of private purchase, etc. It also gives the value of same, or purchase price. Also mails and passenger baggage, if same are carried.

216.—**What is a Protest?*

A paper filed with a notary public as soon as the vessel reaches port, and before hatches are opened, protesting against the ship's owners being held responsible for any possible damage to cargo, owing to leaks, sweat, etc., while on the voyage.

217.—**What is a Charter Party?*

A contract entered into between the captain, owners or agents of the vessel and other parties, whereby the ship agrees for a certain sum of money to transport cargo from one port to another.

218.—**What is Bottomry?*

A mortgage or lien on the vessel or cargo in order to make necessary repairs to the ship in a foreign port. After making said repairs, and sailing again on her voyage, the ship may meet with fresh trouble to hull, spars or sails and be obliged to enter another foreign port to repair damages. Should it be found necessary to give a second bottomry bond in order to prosecute the voyage, then the second bond takes precedence of the first—that is, it must be paid first.

Beaufort Scale of Wind Force

Force	Designation	Miles Per Hour
0	Calm	From 0 to 3
1	Light air	Over 3 to 8
2	Light breeze	Over 8 to 13
3	Gentle breeze	Over 13 to 18
4	Moderate breeze	Over 18 to 23
5	Fresh breeze	Over 23 to 28
6	Strong breeze	Over 28 to 34
7	Moderate gale	Over 34 to 40
8	Fresh gale	Over 40 to 48
9	Strong gale	Over 48 to 56
10	Whole gale	Over 56 to 65
11	Storm	Over 65 to 75
12	Hurricane	Over 75

APPENDIX

From Fifth Supplement to General Rules and Regulations Edition of November 21, 1916

DEPARTMENT OF COMMERCE

Steamboat Inspection Service

Washington

CIRCULAR LETTER **June 13, 1917.**

U. S. Supervising and Local Inspectors, Steamboat-Inspection Service, Manufacturers of Boiler Plate, Boiler Manufacturers, Steamboat Companies, and Others Concerned:

Under the provisions of Section 4405, Revised Statutes of the United States, as amended by the act of Congress approved February 8, 1907; the executive committee of the Board of Supervising Inspectors, Steamboat-Inspection Service, at a called meeting held in Washington, D. C., from June 4 to 12, inclusive, 1917, adopted the following resolutions.

These amendments of the rules, having received the approval of the Secretary of Commerce on June 12, 1917, have now the force of law, and must be observed accordingly.

AMENDMENTS OF ALL CLASSES OF GENERAL RULES AND REGULATIONS

Resolved, That section 8, Rule V, General Rules and Regulations, all classes, be struck out and the following substituted therefor

Renewal of Licenses

8. Whenever an officer shall apply for a renewal of his license for the same grade, the presentation of the old license with oath of office shall be considered sufficient evidence of his title to renewal, which old license and oath of office shall be retained by the inspectors upon their official files as the evidence upon which the license was renewed.

Whenever a licensed officer makes application for a renewal of his license, he shall appear in person before some board of local inspectors or supervising inspector, except that upon renewal of such license for the same grade, when the distance from any local board or supervising inspector is such as to put the person holding the same to great inconvenience and expense to appear in person, he may, upon taking oath of office before any person authorized to administer oaths, and forwarding the same, together with the license to be renewed, to the local board or supervising inspector of the district in which he resides or is employed, have the same renewed by the said inspectors, if no valid reason to the contrary be known to them; and they shall attach such oath to the stub end of the license, which is to be retained on file in their office: Provided, however, That any officer holding a license, and who is engaged in a

service which necessitates his continuous absence from the United States, may make application in writing for renewal and transmit the same to the board of local inspectors, with his certificate of citizenship, if naturalized, and a statement of the applicant, verified before a consul or other officer of the United States authorized to administer an oath, setting forth the reasons for not appearing in person; and upon receiving the same the board of local inspectors that originally issued such license shall renew the same and shall notify the applicant of such renewal, and no license as master, mate, or pilot of any class of vessel shall be renewed without a certificate that the color sense of the applicant is normal. (Secs. 4405, 4438, R. S.)

Amendments of General Rules and Regulations, Ocean and Coastwise

Resolved, That sections 20 to 30, both inclusive, Rule V, General Rules and Regulations, Ocean and Coastwise, be struck out and the following substituted therefor:

Substituting Service in Next Lower Grade for Raise of Grade

20. Except as hereinafter provided, an applicant who has served in a lower grade than that for which he is licensed may substitute service in the grade next below that for which he is licensed, which service shall count one-half in computing experience for raise of grade. For example, if an applicant holds chief mate's license and has served 9 months as

chief mate and 6 months as second mate the 6 months' service as second mate shall count as 3 months' as chief in computing experience.

Master of Ocean Steam Vessels

21. An applicant for license as master of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as chief mate of ocean steam vessels, or

Second. Two years' service as second mate of ocean steam vessels, one year of such service while holding a license as chief mate of ocean steam vessels, or

Third. Two years' service at watch officer actually in charge of a bridge watch on ocean steam vessels, while holding a license as chief mate of ocean steam vessels, or

Fourth. Five years' service as third mate of ocean steam vessels, two years of such service while holding a license as chief mate of ocean steam vessels, or

Fifth. Five years' service on ocean sail vessels of 300 gross tons or over, two years of such service while holding a license as master of sail vessels, or

Sixth. One year's service as master of chief mate of coastwise steam vessels.

Masters of Coastwise Steam Vessels

23. An applicant for license as master of coastwise steam vessels shall be eligible for examination

after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's services as chief mate of ocean or coastwise steam vessels, or

Second. Two years' service as second mate of ocean or coastwise steam vessels, one year of such service while holding a license as chief mate of ocean or coastwise steam vessels, or

Third. Five years' service as third mate of ocean or coastwise steam vessels, two years of such service while holding a license as chief mate of ocean or coastwise steam vessels, or

Fourth. One year's service as master of lake, bay, or sound steam vessels and in addition thereto one year's service as second mate, third mate, quartermaster or wheelsman on ocean or coastwise steam vessels while holding a license as master of lake, bay, or sound steam vessels, or

Fifth. Five years' service on ocean or coastwise sail vessels of 300 gross tons or over, two years of which service shall have been as master, or

Sixth. One year's service as a licensed master of ocean or coastwise sail vessels of 700 gross tons or over, or

Seventh. Two years' service as master of lake, bay, or sound towing steam vessels for license as master of coastwise towing steam vessels of 300 gross tons or under.

In cases where the experience of an applicant for license as master of coastwise steam vessels does not meet the specific requirements of this section,

other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Masters of Sail Vessels

25. An applicant for license as master of sail vessels of over 700 gross tons shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. Five years' service in the deck department of sail vessels of 200 gross tons or over, one year of such service shall have been as master of sail vessels of 500 gross tons or over, or

Second. Two years' service as master of sail vessels of 200 gross tons or over, or

Third. Two years' service as mate of sail vessels of 500 gross tons or over, or

Fourth. Two years' service as master of auxiliary sail vessels of 100 gross tons or over.

In cases where the experience of an applicant for license as master of sail vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Chief Mate of Ocean Steam Vessels

27. An applicant for license as chief mate of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as a licensed second mate of ocean or coastwise steam vessels, or

Second. Two years' service as watch officer on ocean or coastwise steam vessels, while holding license as second mate of ocean or coastwise steam vessels, or

Third. Two years' service as third mate of ocean or coastwise steam vessels, one year of such service while holding a license as second mate of ocean or coastwise steam vessels, or

Fourth. Two years' service as master of lake, bay, or sound steam vessels of 1,000 gross tons or over, or

Fifth. Five years' service in the deck department of ocean or coastwise sail vessels of 200 gross tons or over, two years of which service as chief mate of such ocean or coastwise sail vessels, or

Sixth. Two years' service in the deck department of steam vessels engaged in the ocean or coastwise fisheries, one year of such service to have been as master of such vessels, or

Seventh. Five years' service in the deck department of sail vessels engaged in the ocean or coastwise fisheries, two years of such service to have been as master of such vessels.

In cases where the experience of an applicant for license as chief mate of ocean steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Second Mate of Ocean Steam Vessels

28. An applicant for license as second mate of ocean steam vessels shall be eligible for examination after he shall have furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as third mate of ocean or coastwise steam vessels, or

Second. Three years' service in the deck department of ocean or coastwise steam vessels, one year of such service shall have been as watch officer or quartermaster on such vessels, or

Third. A graduate from the seamanship class of a nautical school ship together with three months' service in the deck department of ocean or coastwise steam vessels, or

Fourth. Three years' service in the deck department of ocean or coastwise sail vessels of 200 gross tons or over, one year of such service shall have been as second mate of such vessel, or

Fifth. One year's service as quartermaster of ocean or coastwise steam vessels while holding a license as third mate of ocean or coastwise steam vessels, or

Sixth. Three years' service as a seaman in the deck department of ocean or coastwise sail vessels together with one year's service in the deck department of ocean or coastwise steam vessels, or

Seventh. Five years' service in the deck department of ocean or coastwise sail vessels of 100 gross tons or over. Service on sail vessels engaged in the

ocean or coastwise fisheries shall be accepted as meeting the requirements of this paragraph, or

Eighth. One year's service as first-class pilot of lake, bay, or sound steam vessels of 500 gross tons or over, together with three months' service in the deck department of ocean or coastwise steam vessels, or

Ninth. One year's service as master of lake, bay, or sound steam vessels of 500 gross tons or over.

In case where the experience of an applicant for license as second mate of ocean steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Third Mate of Ocean Steam Vessels

30. An applicant for license as third mate of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. Two years' service in the deck department of ocean or coastwise steam vessels, or

Second. Three years' service in the deck department of ocean or coastwise sail vessels, or

Third. A graduate from the seamanship class of a nautical school ship, or

Fourth. One year's service as master or pilot of lake, bay, or sound steamers.

In cases where the experience of an applicant for license as third mate of ocean steam vessels does

not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Examination for License as Third Mate of Ocean Steam Vessels

31. An applicant for license as third mate of ocean steam vessels shall be required to pass a satisfactory examination as to his knowledge of the following subjects:

1. Latitude by meridian altitude of the sun.
2. Day's work.
3. Mercator's sailing.
4. Determination of distance from a fixed object.
5. Chart Navigation.
6. International rules for preventing collisions at sea.
7. Stowage of cargo.
8. Storm signals.
9. Such further examination of a non-mathematical character as the local inspectors may require.

Chief Mate of Coastwise Steam Vessels

32. An applicant for chief mate of coastwise steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as second mate of ocean or coastwise steam vessels, or

Second. One year's service as first-class pilot of lake, bay, or sound steam vessels, together with one year's service as quartermaster or wheelsman on ocean or coastwise steam vessels while holding a license as first-class pilot of lake, bay, or sound steam vessels, or

Third. Two years' service as third mate of ocean or coastwise steam vessels, or

Fourth. Two years' service in the deck department of steam vessels engaged in the ocean or coastwise fisheries, one year of such service to have been as master of such vessels, or

Fifth. Five years' service in the deck department of sail vessels engaged in the ocean or coastwise fisheries, two years' of such service to have been as master of such vessels, or

Sixth. Two years' service as master of ocean or coastwise sail vessels of 200 gross tons or over, or

Seventh. Three years' service in the deck department of ocean or coastwise steam vessels for license as chief mate of coastwise steam vessels of 500 gross tons or under, or

Eighth. Two years' service in the deck department of ocean or coastwise sail vessels together with one year's service in the deck department of ocean or coastwise steam vessels for license as chief mate of coastwise steam vessels of 500 gross tons or under, or

Ninth. One year's service as master or two years' service as first-class pilot of lake, bay or sound tow-

ing steam vessels for license as chief mate of coastwise towing steam vessels of 300 gross tons or under.

In cases where the experience of an applicant for license as chief mate of coastwise steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Second Mate of Coastwise Steam Vessels

33. An applicant for license as second mate of coastwise steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as third mate of ocean or coastwise steam vessels, or

Second. One year's service as quartermaster or wheelsman on ocean or coastwise steam vessels while holding a license as third mate of ocean or coastwise steam vessels, or

Third. Three years' service in the deck department of ocean or coastwise steam vessels, or

Fourth. Two years' service in the deck department of ocean or coastwise sail vessels together with one year's service in the deck department of ocean or coastwise steam vessels, or

Fifth. A graduate from the seamanship class of a nautical school ship together with three months' service in the deck department of an ocean or coastwise steam vessel, or

Sixth. One year's service as a licensed master of

lake, bay, or sound steam vessels, or

Seventh. Two years' service as first-class pilot of lake, bay, or sound steam vessels, or

Eighth. One year's service as first-class pilot of lake, bay or sound steam vessels, together with three months' service in the deck department of ocean or coastwise steam vessels, or

Ninth. One year's service as chief mate of ocean or coastwise steam vessels engaged in the fisheries, or

Tenth. One year's service as master of ocean or coastwise sail vessels engaged in the fisheries.

In cases where the experience of an applicant for license as second mate of coastwise steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Third Mate of Coastwise Steam Vessels

34. An applicant for license as third mate of coastwise steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. Two years' service in the deck department of ocean or coastwise steam vessels, or

Second. Three years' service in the deck department of ocean or coastwise sail vessels, or

Third. A graduate from the seamanship class of a nautical school ship, or

Fourth. One year's service as master or first-class pilot of lake, bay, or sound steam vessels.

In cases where the experience of an applicant for license as third mate of coastwise steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

CLASSIFICATION OF ENGINEERS

Chief Engineer of Ocean Steam Vessels

34. An applicant for license as chief engineer of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as first assistant engineer of ocean or coastwise steam vessels, or

Second. One year's service as chief engineer of lake, bay, or sound steam vessels, or

Third. Two years' service as first assistant engineer of lake, bay, or sound steam vessels, or

Fourth. Two years' service as second assistant engineer of ocean or coastwise steam vessels, or

Fifth. Three years' service in the engine department of an ocean or coastwise steam vessel for license as chief engineer of ocean steam vessels of 500 gross tons or under.

In cases where the experience of an applicant for license as chief engineer of ocean steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

First Assistant Engineer of Ocean Steam Vessels

An applicant for license as first assistant engineer of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as second assistant engineer of ocean or coastwise steam vessels, or

Second. One year's service as chief or first assistant engineer of lake, bay, or sound steam vessels, or

Third. Two years' service as third assistant engineer of ocean or coastwise steam vessels, or

Fourth. Three years' service as an apprentice to the machinist trade and engaged in the construction or repair of marine, stationary, or locomotive engines, together with one year's service in the engine department of ocean or coastwise steam vessels, or

Fifth. A graduate from the engineering class of a nautical school ship together with 6 months' service in the engine department of ocean or coastwise steam vessels, or

Sixth. A graduate in mechanical engineering from a duly recognized school of technology, together with 6 months' service in the engine department of ocean or coastwise steam vessels, or

Seventh. Two years' service as a locomotive or stationary engineer, together with one year's service in the engine department of ocean or coastwise steam vessels, or

Eighth. Two years' service as second assistant engineer of lake, bay, or sound steam vessels, or

Ninth. Three years' service in the engine department of ocean or coastwise steam vessels, for license as first assistant engineer of ocean steam vessels of 1,000 gross tons or under.

In cases where the experience of an applicant for license as first assistant engineer of ocean steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Second Assistant Engineer of Ocean Steam Vessels

An applicant for license as second assistant engineer of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. One year's service as third assistant engineer of ocean or coastwise steam vessels, or

Second. Six months' service as chief engineer, first assistant engineer or second assistant engineer of lake, bay, or sound steam vessels, or

Third. One year's service as third assistant engineer of lake, bay, or sound steam vessels, or

Fourth. Three years' service as oiler, or water tender, or combined service of three years in these positions, on ocean or coastwise steam vessels, or

Fifth. A graduate from the engineering class of a nautical school ship together with 3 months' service in the engine department of ocean or coastwise steam vessels, or

Sixth. A graduate in mechanical engineering from a duly recognized school of technology, together with 3 months' service in the engine department of ocean or coastwise steam vessels, or

Seventh. Three years' service as an apprentice to the machinist trade and engaged in the construction or repair of marine, stationary, or locomotive engines, together with 6 months' service in the engine department of ocean or coastwise steam vessels, or

Eighth. One year's service as a locomotive or stationary engineer, together with 6 months' service in the engine department of ocean or coastwise steam vessels, or

Ninth. One year's service as a stationary engineer in full charge of a plant of not less than 1,000 horsepower.

In cases where the experience of an applicant for license as second assistant engineer of ocean steam vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Third Assistant Engineer of Ocean Steam Vessels

An applicant for license as third assistant engineer of ocean steam vessels shall be eligible for examination after he has furnished satisfactory documentary evidence to the local inspectors that he has had the following experience:

First. Three years' service as fireman on ocean or coastwise steam vessels, or

Second. Two years' service as oiler, or water tender, or combined service of two years in these positions, on ocean or coastwise steam vessels, or

Third. Six months' service as chief or assistant engineer on lake, bay, or sound steam vessels, or

Fourth. One year's service as chief or assistant engineer of river steam vessels, or

Fifth. A graduate from the engineering class of a nautical school ship, or

Sixth. A journeyman machinist who has been engaged in the construction or repair of marine steam engines.

In cases where the experience of an applicant for license as third assistant engineer of ocean vessels does not meet the specific requirements of this section, other service which the local inspectors consider a fair and reasonable equivalent may be accepted by them in lieu of the service herein specified.

Qualifications Required for License as Engineer of Steam Vessels and License Forms Required

35. No person shall receive an original license as engineer or assistant engineer of ocean steam vessels who has not had the experience required by the foregoing section, or experience which is deemed by the local inspectors to be a fair and reasonable equivalent therefor. The examination for license as chief or assistant engineer of ocean steamers shall be such as to satisfy the local inspectors that the applicant is capable of meeting the requirements and performing the duties required by the grade of

license for which he makes application. No original license shall be granted any engineer who can not read and write and who does not understand the plain rules of arithmetic. Licenses to engineers of ocean steam vessels shall be issued on Forms 876, chief engineer's license, and 877, assistant engineer's license, according to grades of chief and assistant engineers specified in Rule V.

8 State Street *New York*

Uttmark's Nautical Academy

Established 1882

CAPTAIN FRITZ E. UTTMARK, Principal

Candidates prepared for **Master's, Mate's** and **Pilot's** license.

Warrant Officers, Petty Officers and Seamen in the U. S. Navy prepared for examinations. All other branches of nautical science taught, including Nautical subjects pertaining to all grades of Civil Service examinations.

The school is conducted on the highest principles of modern teaching—up to date in every respect.

Students wishing to retain their position on board ship while studying for their original license, or raise of grade, may do so by using Uttmark's Guide and attending school during their spare time when the vessel is in port, then problems will be explained and work for the next voyage assigned. *This plan has worked well.*

Satisfaction fully guaranteed to every student.

What Others Say

MY DEAR CAPTAIN UTTMARK:

* * * Please accept my congratulations and wishes for a successful career with your Navigation School. This school has the reputation of being the best resident Nautical School in the United States. * * *

CAPT. E. K. RODEN,
Principal, Department of Navigation, International Correspondence School, Scranton, Pa.

It is with pleasure that I write to thank you for your great interest during my course of instruction in Your Navigation School. I passed my master's examination before the Local Inspectors without any trouble. I advise anyone wishing to obtain a license for steam or sail vessels to first take a course in your school. I wish you the great amount of success which I am sure you will have. * * *

CHARLES E. SMALL,
Master, S. Y. Cristina.

Having qualified for a Master's License for Ocean Steamers, and Ocean Sailing Vessels, under the instruction of Captain F. E. Uttmark, it is with pleasure I recommend him to any one wishing to study Navigation, as an efficient teacher, and one who takes interest in his pupils.

CAPT. W. D. DAVIS,
c/o Standard Oil Co. of New York.

MY DEAR CAPT. UTTMARK:

I am pleased to advise you that I have successfully passed the examination before the Local Inspectors as Master for Sailing

Vessels of over 700 tons, on any ocean, and also Chief Mate of Ocean-going Steam Ships. * * * I take great pleasure in recommending your School of Navigation. * * *

KARL WARNER,
Master, Schr. Waltham.

I have successfully passed my examination and obtained my Master's License and thank you for your schooling which enabled me to obtain this result.

(Captain) GEORGE L. FOLKER,
Nantsport, Nova Scotia.

It is my firm belief that your method of teaching is the most thorough and at the same time the most simplified there possibly could be found in this country.

M. B. BEEKMAN,
2nd Officer, S. S. Lampasas.

Your method of teaching Navigation is most satisfactory, being clear and comprehensive. I can heartily recommend your school.

CHARLES W. EPSBERG,
3rd Officer, S. S. Yanguez.

It was due to the course I took in Navigation at your College last Spring, that I was able to graduate from the New York State Nautical School.

R. B. MANN,
Morristown, N. J.

Naval Warrant and Petty Officers and Seamen

Since the law went into effect making warrant officers eligible for line commissions as ensign in the Navy, a num-

ber of boatswains and gunners have studied in this school and successfully passed the Naval Board. Other warrant officers have qualified here as practical navigators, received licenses as watch and navigating officers from the U. S. Local Inspectors of Steam Vessels, and have been ordered to the command of cruising tugs and other auxiliary naval vessels.

I wish to add my word of commendation of your excellent institution.

I attribute the success I have achieved in attaining my present rank in the Navy largely to the thorough, efficient and practical system of instruction I received while in attendance at your school.

Any one contemplating taking up the study of Navigation would do well to investigate the merits of the course you offer, especially candidates for promotion to Boatswain in the Navy, to whom I strongly recommend your Navigation School.

C. K. R. CLAUSEN,
Chief Boatswain, U. S. Navy.

I take great pleasure in testifying to the excellent instruction I received from you while a student at your College. I was appointed a warrant officer in the Navy shortly after graduation, and have found the course of instruction has benefited me greatly in performing my duties since, especially while detailed as a hydrographic observer with the Cape Cruz Casilda Survey Expedition, and again recently while acting as Executive of an auxiliary naval vessel. I can conscientiously recommend any nautical school of which you may be principal to any warrant-officer who aspires to navigate an auxiliary vessel.

GREGORY CULLEN,
Boatswain, U. S. Navy.

After vainly trying to master the subject of practical Navigation for a number of years, I took your Navigation course with the most gratifying results. I was not only able to pass the U. S. Local Inspectors for a Mate's License, but took command of the U. S. S. Osceola, and successfully navigated her to Cuba. All my problems at sea worked out exactly as taught, thanks to your excellent method of instruction, which was thorough and practical and easily grasped.

THOMAS MACKLIN,
Boatswain, U. S. Navy.

I gladly testify to the method of Navigation instruction at your school.

The knowledge gained by me while a student in the institution will prove of lasting value, both as a navigator and as a watch officer.

Not only is the theory of the science expounded in a clear, intelligible way, but the practical part of Navigation is dealt with in a sailorly manner, so that one may go from your classroom to the deck of a vessel, and at once put his knowledge into practice.

M. J. CONLON,
Boatswain, U. S. Navy.

I take pleasure in writing these few lines to let you know that I received my license, also an appointment as ensign in the Naval Auxiliary. Words cannot express my gratitude to you and your teachers for the wonderful course you gave me in such a short time.

ALLEN W. PATTON,
Ensign, U. S. N. R. F.

My endorsement of your school and your excellent method of instruction will be a continuous endeavor on my part to get any

one desiring the necessary information and schooling in obtaining a license to join your school.

WM. FIELDMAN,
S. S. Santa Clara.

I am sending you a few lines to express my gratitude and to thank you for your good teaching, also for the interest you took in teaching me during the four weeks' course in navigation. I was able to pass the examination as 2nd mate coastwise and 3rd mate on any tonnage of any ocean without any trouble.

I now hold a position as 3rd mate on the S. S. El Rio of the Morgan Line. I will gladly recommend you to any one wishing to learn navigation, and wish you success with your school.

BERENT AUGUST RASMUSSEN,
734 51st Street, Brooklyn, N. Y.

It is with pleasure that I write and thank you for the great interest you took in me and for the simple way of explaining navigation which enabled me to pass before the Local Inspector for master's license.

I wish you great success in the future and I shall have the pleasure of recommending your Nautical Academy to anyone wishing to obtain their license.

J. JOHANSEN,
Mate, S. S. Owego.

Thinking that this may be of interest to you, I am taking this opportunity of advising you that after having completed your course in navigation, I successfully passed the U. S. Local Inspector's examination for master of steam vessels of any tonnage on the waters of any ocean.

I also wish to say that I was very favorably impressed with the thoroughness of your methods of teaching and gladly recommend your school to anybody desiring to take a course in navigation.

G. S. SPINNEY,
First Officer, Steam Yacht "Cyprus."

I am writing to thank you for the great interest you took in me while attending your school. I had no trouble in passing the Local Inspectors at New York the day I received my license.

S. WILLESEN,
S. S. Floridian.

At the completion of my term in your school I want to tender my sincere thanks for your kind, patient and never-ceasing work in helping me to finish my course.

What I at first thought would be great difficulties were put before me so clearly through your kind efforts that I passed my examination with comparative ease.

RICHARD ALBRECHT,
767 Forest Avenue, Bronx.

Please accept my thanks for your great interest taken in me during my course of instruction at your school. I cannot speak too highly of your method of teaching navigaton, and greatly admire your patience and interest taken in those men wishing to study for their license.

Having recently passed the Local Inspectors' Examination without trouble is proof of your ability as an efficient instructor in navigation.

I can highly recommend you to anyone wishing to obtain a license.

FRED W. STEHR,
3rd Mate, S. S. Sabine.

I take great pleasure in writing you this letter to announce that I have passed the U. S. Local Inspectors and received the license for second mate on any ocean and any gross tonnage. I must say that when I was under your instruction for navigation I received the most excellet instruction from you.

I will be very glad to recommend your school to anyone interested in navigation.

Kindly accept my best wishes for a great success.

H. A. WOLLENWEBER, *U. S. N.*

A few lines from one of your former students to tell you that I have often been thankful for the course I took at your school last summer. It enabled me to get a chief quartermaster's rating in the Reserve.

You will be interested to know that I have received my commission as ensign yesterday. I will always feel that your admirable school did more for me than any other one thing. The navigation I learned at your school has stood me in such good stead that I attribute my advancement in the Reserve largely to it.

JOHN T. ARMS,
Hotel Lorrane, Norfolk, Va.

Mr. Lockwood wishes to join me in stating that the course of Practical Navigation we took in your school has helped us greatly in our work in the United States Naval Reserve Force.

When diplomatic relations with Germany were broken a year ago last February, Mr. Lockwood and I decided that we wanted to get into the navy before war came. We applied at the Recruiting Office and were told that the rating of a first-class seaman was the best they could give us. Then we started your course of Practical Navigation in the middle part of April. The first of May we tried the Recruiting Office again, and were both enrolled as Boatswain's Mates, first-class, on the strength of our taking your course. We finished the course in June, and after being on duty at Newport, R. I., until December 1 applied for transfer to the Intensive Training School for Deck Officers in the United States Naval Auxiliary Reserve.

We were told that only men with college educations were accepted for this course, and also that we were slightly beyond the age limit. However, upon our telling them of the work done in your school, we were allowed to take the course. We were put on board a ship plying between here and a Southern port, and although we had never had any practical work in navigation, found that it came to us very easily. Mr. O. Berg, an ex-student of your school, was the Chief Mate on the boat we were on, and with our course with you, and a little coaching from him, it proved comparatively easy for us to take up the actual work.

ELLSWORTH B. DOANE,
U. S. Naval Reserve Force, Pelham Bay, N. Y.

Numerous other letters from satisfied students have been received and may be seen at the school.

LIST OF PUBLICATIONS

Uttmark's Guide to Examination for Masters and Mates..$2.00

Uttmark's Nautical News—2 years..... 1.00

Textbook on St. Hilaire's Method..... 2.00

Uttmark's Plotting Chart, in pads of 25 charts..... 3.00

Ready Reckoning Pads, 75 sheets each, St. Hilaire Method (Sun)..... .50

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Ready Reckoning Pads for all Navigation Problems, 25 and 50 cents each.

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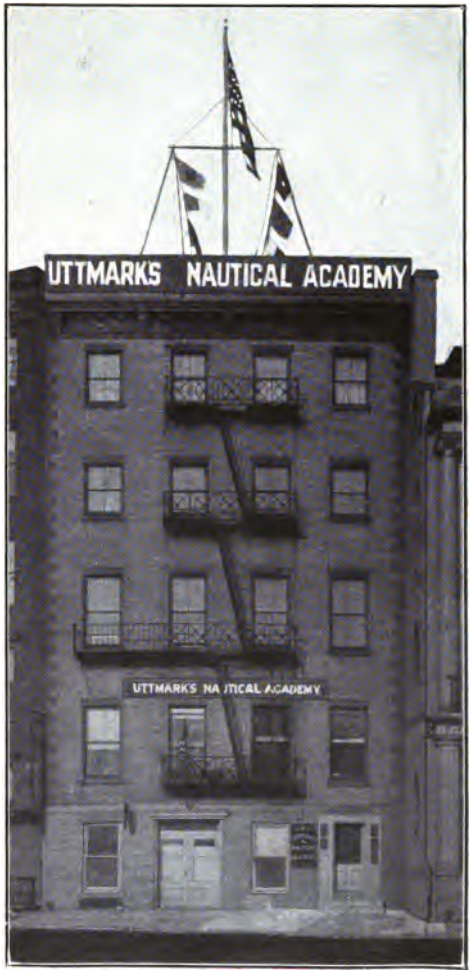

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Instruction in the Use of Signals

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Chart Room

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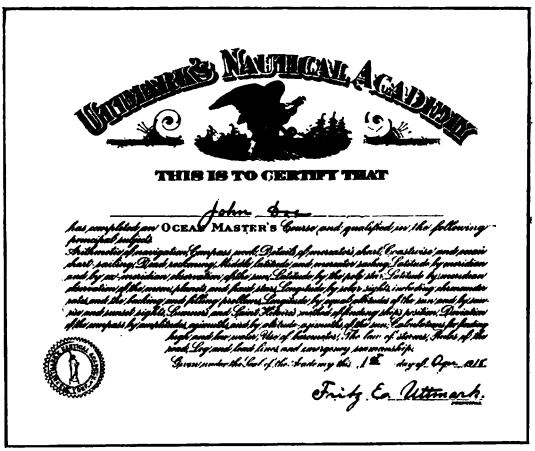

Reproduction of Diploma

Diplomas for the various courses are issued to all students upon graduation.